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EVERYBODY'S MAGAZINE

FOR APRIL

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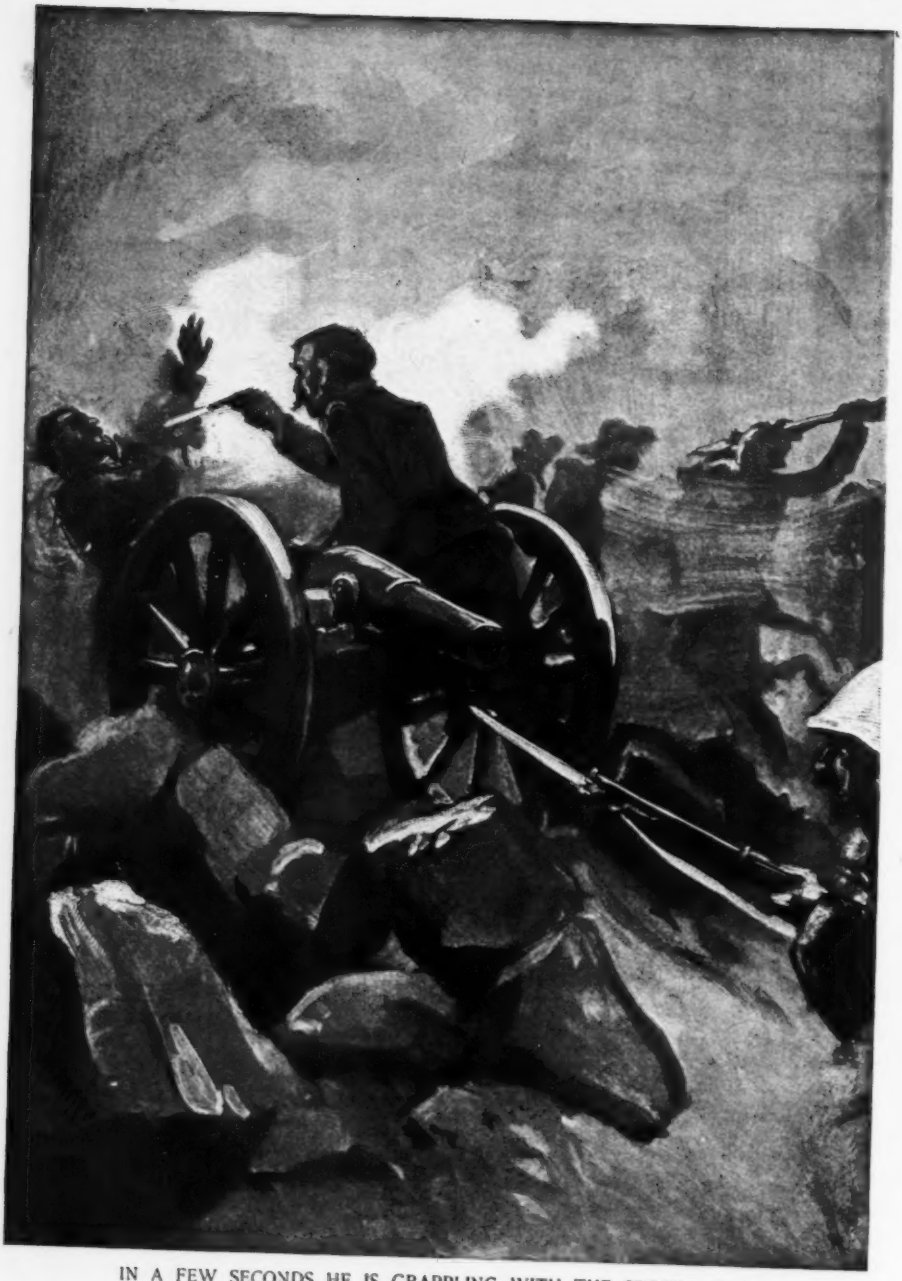
No. 8

"It's not me ye should be thankin' mum; it's SAPOLIO that keeps things clean and bright!"



IN A FEW SECONDS HE IS GRAPPLING WITH THE SECOND GUN.

See p. 360.

U. S. ARMY 12-INCH COAST-DEFENCE GUN MOUNTED ON BARBETTE CARRIAGE.

THE DEFENCE OF OUR COASTS.

By F. Heath, Jr.

[*An article describing how the monster weapons are made for the protection of our coasts, and showing with what effect they could and would be used against a foreign fleet.*]

Notwithstanding the fact that our war with Spain has come to a close, the great army gun factory is to-day humming with activity and work; in every direction one hears the roar of ponderous wheels, the rumbling of great travelling cranes, the rattle of colossal chains, and the clang of heavy hammers.

While the steady rush of preparing the necessary material for the manufacture of coast defence guns is advantageously felt throughout the iron and steel world of the United States, the greater part of this all-important work centres largely around the great arsenals of the United States army, where these modern guns of every calibre from the 3.6-inch field mortar to the huge 16-inch coast-defence guns, together with their mounts, ammunition, etc., are manufactured.

On the western banks of the placid Hudson, between the cities of Troy and Albany, lies the large army reservation known as Watervliet Arsenal, where stands the great gun factory in which is manufactured the heavy guns to be mounted for our national defence.

The Watervliet Arsenal Gun Factory, as it is known, is probably the largest single shop building in the United States, possibly in the world. Here are found the smallest machines for the fine work on the breech mechanism, to the huge turning and boring lathes, from 58 to 98

ARMY GUN FACTORY, WATERVLIET ARSENAL.

feet in length, the finishing lathes, and the great rifling machines, on which latter is probably done the most delicate work required in the manufacture of a coast-defence gun. Besides the complete equipment of machinery for the manufacture of these modern weapons of war, the gun factory has also in its equipment three huge electric cranes, which are used in the handling of the great guns during their various stages of manufacture. The smallest of these marvels of mechanical ingenuity has a capacity of 30 tons, the second 75 tons, and the third and largest a lifting capacity of 130 tons. An idea of this wonderful strength can only be obtained by visiting the gun factory personally, and witnessing with what smooth ease and rapidity one of these cranes picks up a 50-ton gun, carries it the full length of the shop, and places it in exactly the right position on one of the large lathes or in the shrinkage pit. These cranes may be used either singly, or together when an exceptionally heavy weight has to be lifted and transported to another part of the building. In the way of machinery, these great cranes are of exceptional value in saving time, and in fact are undoubtedly the greatest labor and time-saving devices of the present day.

Another object of special interest is the great shrinkage pit situated in the central section of the building. In this pit, which is 20 x 40 feet in width and 50 feet deep, is performed one of the many intricate operations in the making of a big gun about which the civilian knows little or nothing.

The prevalent idea among those who have taken no special interest in the subject of coast defence, and still less in the method of manufacturing the heavy guns for this purpose, is that one of our modern high-power guns is nothing more than a mass of steel with a hole bored through and convenient for loading at either end. Practically this is so, but theoretically it is absolutely false; and therefore for the information of those who have already taken some interest in this subject and for the few whose interest has undoubtedly been quickened as a result of our late war, with a desire to know something of these heavy guns for our coast fortifications, an outline description of the manufacture, power, and other points of interest in connection with these powerful defenders of our nation as developed and adopted by our army, will be given.

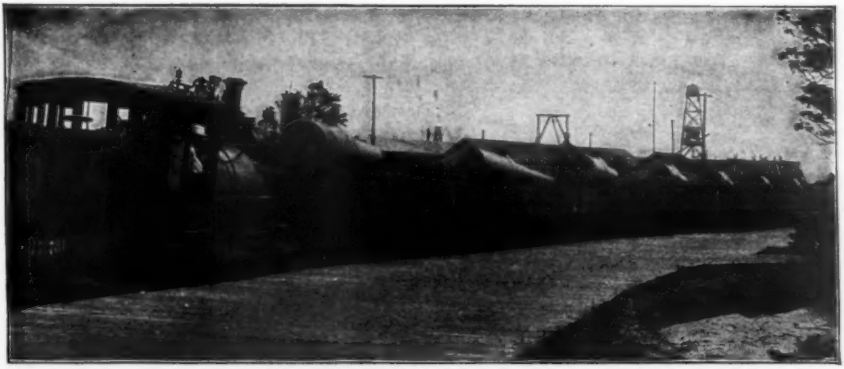
These heavy guns are known among army officers as guns of the built-up, forged

steel type, and are composed of a main inner tube which constitutes the wall of the bore of the gun, extending from breech to muzzle, superposed by a forged steel jacket and hoops, the latter varying in number according to the size and type of the gun.

The modern 12-inch, breech-loading, steel, rifled cannon is composed of the main inner tube, the jacket, trunnion-band, and nine steel hoops. At the breech of the gun, where the explosion of the powder charge occurs, and where thus the greatest pressure has to be withstood when fired, this main tube is surrounded by the steel jacket and two rows of the steel hoops, which number of hoops diminishes to one toward the muzzle end of the gun. The jacket and each hoop after being cast with exceptional care and accuracy are received in their rough state at the gun factory, where with equal care and accuracy they are turned down to the exact dimensions required; it may hardly seem possible, but with such delicacy and precision are these measurements made to come up to the required standard of accuracy, that those taken of the massive pieces of steel weighing from 10,000 to 30,000 pounds are finer and more accurate than any measurement necessary in the manufacture of the finest watches.

When ready for shrinkage, the hoops and jacket are slightly less in their interior diameter than the exterior diameter of the tube or hoop over which they are to be shrunk. This diameter must be of just such a length as will make the jacket or hoop compress against the inner tube with an exact required tension when shrunk on.

The big steel jacket, which is the first one shrunk on the main tube, weighs about 35,000 pounds, and is expanded by being placed in a fire-brick furnace inclosed in an iron cylinder with a considerable space between the two walls, and a heavy metal cover over the top of both. This furnace is built in, and forms part of the shrinkage pit. The jacket, while being heated, usually remains in the furnace for about thirty hours, where it is expanded by being raised to a dull red heat at a temperature of about 700° F. During this period of expansion the greatest care possible is exercised to prevent any foreign particles from becoming amalgamated with the metal. Meanwhile the great main tube has been placed vertically in position in the pit, muzzle down, where every precaution has been taken to see that it does not expand the thousandth part of an inch, which, if permitted, would seriously affect the entire process. The jacket is still in the furnace, where every few minutes it is carefully and accurately measured, so accurately, that a variation of more than the .003 part of an inch is detected. When the required diameter is at last ob-



SHIPMENT OF 12-INCH COAST-DEFENCE MORTARS TO OUR MODERN SEA-COAST FORTIFICATIONS FROM THE ARMY PROVING GROUND AT SANDY HOOK.

MOUNTING A 12-INCH COAST-DEFENCE GUN ON ONE OF OUR MODERN FORTIFICATIONS.

tained and all is in readiness, the jacket is carefully lifted from the furnace by one of the big cranes, and carried a few feet to the tube, which has gone through the last preliminary preparations, and over which it is gently lowered to the exact position required.

This is another of the delicate operations called for in the manufacture of one of the heavy guns for our coast fortifications, as the variation of a few thousandths of an inch from the exact position required after the hoop has been shrunk over the main tube would render the gun practically useless, and the reheating of the hoop, necessary in order to change its position to that required, would weaken the metal to such a degree as to necessitate the procurement of another hoop at a great expense. From this we may well judge of the care necessary and fully observed in the various stages of manufacture of one of these guns.

After the jacket has been properly placed over the tube, the gun remains in the pit under a cool stream of water for about fifty hours, when it is removed and placed on one of the largest lathes, to be turned down to the proper dimension necessary to receive the next hoop. Each hoop is treated and shrunk on in the same manner, calling for especially delicate work, since the various hoops are hooked together by shoulders to prevent slipping or distortion from shock of discharge when the gun is fired. Upon heating, the expansion of the hoop to be shrunk on enables its shoulders to pass over those of the tube or jacket over which it is to be shrunk. The gun is then cooled down in the manner before stated, and when finally removed from the pit the shoulders are found to fit so closely, and to grip each other with such pressure as to be practically one piece of metal.

After the guns have gone through the different processes of being hooped, jacketed, and turned down to the final dimensions, during which all the work in handling these heavy pieces of ordnance is done

by one or more of the big cranes, they are placed in one of the largest machines for the very slow and delicate process of rifling, which probably takes a greater length of time than any other process required in the manufacture of one of these modern guns.

This work finished, the breech mechanism, a marvel of mechanical skill and ingenuity, of very fine but strong mechanism, is attached to the gun, and the monstrous weapon of war is almost ready for service; not quite ready, for after completion at Watervliet Arsenal, these big guns before acceptance are shipped either by land or by water to the great army proving ground at Sandy Hook, New York Harbor, for test to determine their strength and fitness for service, after which they are despatched to the various defences in progress of construction, so soon as the place for each gun is ready for its reception.

From this outlined description of the manufacture of one of the powerful guns to be used in our modern fortifications, for the protection of the great cities and harbors along the Atlantic and Pacific coasts, only the faintest conception is had of the very slow, delicate, and accurate work, and the various stages of development required in the production of such ponderous weapons. The length of time necessary to build one of the largest of these guns is from eight to twelve months, and the records of measurements taken during the various stages through which the gun has to pass before completion are most carefully kept, these records being then sent to Washington, where they are published in book form separately for each gun, each book being about an inch in thickness. From this an idea may be gained of the number of measurements taken during the period of manufacture.

This is the work that keeps the great wheels at the army gun factory turning, and gives labor and employment to many of our citizens. From the date of the declaration of war with Spain up to the present time, the great gun factory at Watervliet Arsenal has been kept running both night and day, the guns upon completion being immediately shipped to their various points of destination.

The factory is most conveniently situated for general transportation by either land or water. Through the main central section of the building, and at right angles to the building proper, runs a government railroad which connects just outside of the Arsenal limits with the Delaware and Hudson Railroad on the west, and on the east with the large government stone dock on the Hudson River. For the transportation of these heavy guns special cars have been manufactured by the different railroads. The railroad which leads from the main shop building to the dock has to pass over a branch of the Erie Canal, which passes through the Arsenal. For this purpose a single-span steel bridge has been constructed, which is claimed to have a greater tonnage capacity than any other bridge of its size in the world. This is necessary on account of the great weight of the gun, the extra weight of the car and the engine combined.

The work here is entirely in charge of the ordnance officers, all graduates of West Point, who are held responsible for every gun manufactured. All appointments to this branch of the service are made from the artillery, cavalry, and infantry branches, but mostly from the artillery, after a very severe competitive examination, thus placing in the Ordnance Department the most talented and industrious officers of the army, and it is the result of the untiring labors of these officers that has given to the United States Government the most perfect types of modern guns.

The guns manufactured at Watervliet Arsenal for army service are divided into three classes: namely, the field, the siege, and the coast-defence guns. These guns are thirteen in number, and consist of the 3-inch, the 3.2-inch, and the 3.6-inch breech-loading, steel, rifled cannon and the 3.6-inch mortar for field service; the 5-inch siege rifle, the 7-inch siege howitzer, and the 7-inch siege mortar, which, if circumstances had permitted, would have

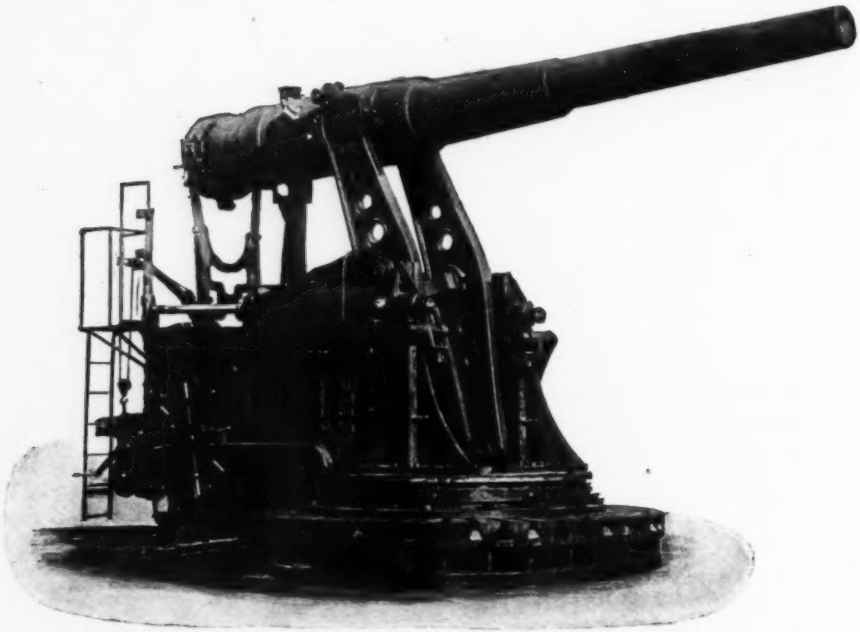
played such an important part in the siege before Santiago; and the ponderous 8, 10, and 12 inch coast-defence guns, marvels of mechanical ingenuity and workmanship, and unsurpassed, even unequalled, by any other guns of this class in the world, assisted by the 3, 5, and 6 inch rapid-fire guns.

Owing to the secrecy, quietness, and lack of display with which the army does its work, very little, if anything, is known of the different guns adopted, of their marvellous power, unlimited strength, and wonderful endurance.

The titanic harbor and coast-defence guns which are mounted in our modern fortifications extending along the Atlantic and Pacific coasts, and which are now being manufactured at Watervliet Arsenal, are models of perfection in modern high-power guns; they are unequalled by those of any other power for service on either land or sea.

These guns are divided into three calibres: namely, the 8-inch, 10-inch, and 12-inch coast-defence guns and the 12-inch coast-defence mortar.

The question might be asked: Do the results obtained from these heavy coast defenders justify the great labor, time, and expense required in the manufacture of one of these guns? An outline description of the marvellous strength, stupendous power, and wonderful accuracy of these powerful weapons of war will, I think, affirmatively answer this question in itself.



10-INCH COAST-DEFENCE GUN, MOUNTED ON U. S. ARMY DISAPPEARING CARRIAGE (FIRING POSITION).

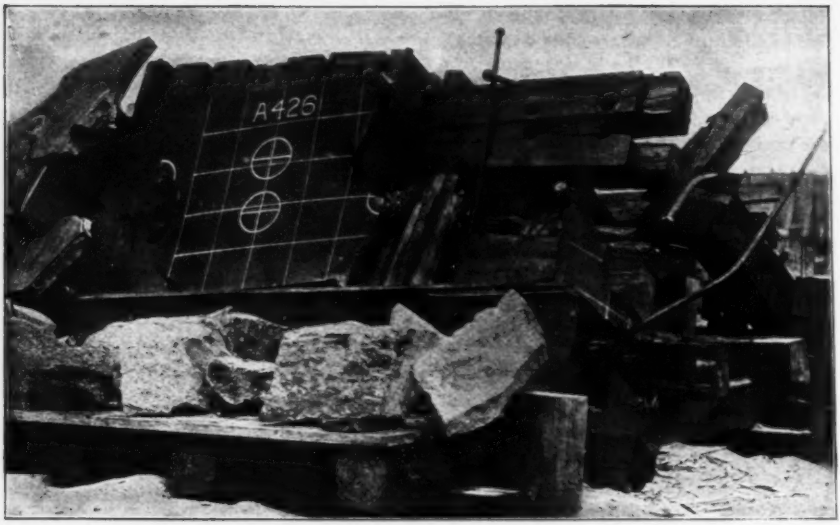
With the exception of the great 16-inch gun now in course of construction at Watervliet Arsenal, the largest and most powerful of these guns as adopted by our army is the 12-inch breech-loading, steel, rifled cannon. This gun is 36 feet in length, and weighs a total of 57 tons, or 127,680 pounds. With a charge of 520 pounds of prismatic powder, producing upon explosion a pressure of 36,000 pounds to the square inch on the breech of the gun, this cannon hurls a forged steel

armor or deck-piercing projectile of 1,000 pounds weight over a range of ten miles. This mass of steel leaves the gun at a velocity of 2,200 feet per second, and at a range of from three to five miles would pass completely through the thickest armor of a battleship, and explode upon reaching its interior. This explosion is produced by means of a wonderfully accurate time fuse, which effects the explosion after the projectile has reached the interior of the vessel and is in the midst of the fine machinery, the magazine of the vessel, or its crew. Without the fuse, the projectile would strike the ship with such force as to pass completely through it, unless obstructed in its course by the interposition of such obstacles as the great engines and boilers of the battleship, which would be completely demolished, and which are more to a war vessel than its heaviest gun and thickest armor.

At ranges of from six to seven or even eight miles the war-ship would be in very little less danger than if within a very much closer range from the land defence, and could not itself attack the fortification, as the range of a gun of the same calibre mounted on a battleship is only about two-thirds the range of the same gun mounted behind one of our coast defences. This is due to the fact that the same firing elevation cannot be given a gun mounted on the deck of a vessel that can be given a gun of the same calibre mounted on land, as the great energy and direction of the recoil of the gun after fire would cause the whole gun and carriage to crash through the protected deck of the vessel. On land this danger is eliminated. We are very often led astray by the sensational news in the papers of the great 13-inch guns just mounted on the deck of one of the new men-of-war, and are told that these great guns have a range of from twelve to fifteen miles. Without going into further detail, the public takes it for granted that a war-ship can lie outside of Sandy Hook and send a shot that will hit any flat in Harlem. The public is very much mistaken. If mounted on land, the range of these navy guns would be about ten or eleven miles at the greatest; but the moment they are mounted on the deck of their assigned battleship, this range is reduced from eleven miles to about six at its greatest, and with any chance of reaching the object aimed at, this six miles is reduced to about two. This same gun mounted in one of our modern land defences has a range of ten miles at any time, and can do its greatest damage at any range of from five to seven miles. Thus a ship can be attacked, and be an excellent target, when the land defence is in no possible danger.

The heaviest armament on a war-ship is, in defensive power, not to be compared with one of our modern coast-defence fortifications. This statement may seem rather strong, especially to those whose whole attention has been turned of late to the navy; but it is a fact, and a generally accepted one in military circles. It should be noticed that the word "defensive," not "offensive," is used. For offensive operations, the navy is undoubtedly superior; but for the defence of coast, our harbors and coast-line cities, our land defences are unequalled and always will be. The limit of thickness of the protective armor for the warship has been reached, and the general talk now is of decreasing it; for land defences, protection is unlimited, accuracy and range greater, and results should be more final. At a range of from four to six miles, the destruction that would be wrought by a 1,000-pound forged steel deck or armor-piercing shell, carrying from 50 to 100 pounds of emmensite or wet gun-cotton, and fired from one of these modern 12-inch, breech-loading, steel, coast-defence guns, upon striking one of the heaviest protected battleships is beyond conception; it would be complete demolition.

As to the accuracy of these heavy guns, it is only necessary to give the records of one or two of the many thousands of firings made with these different type guns, to give the public an idea of what the chances are of hitting a battleship broadside or of striking its deck, which forms such a smooth level surface for a target.



SHOWING RESULTS OF FOUR SHOTS FROM U. S. ARMY COAST-DEFENCE GUN AGAINST STEEL ARMOR-PLATE FOR BATTLESHIPS.

At some recent firings made with an 8-inch coast-defence gun at a range of two miles, the several shots passed consecutively through the hole made by the first shot. This statement and marvellous record is verified by a photograph of the target taken after the last shot was fired, and by official records, and it may be added that the position of the gun was changed, and the gun reaimed after each round.

In the greater number of our modern defences the 8, 10, and 12 inch guns are mounted upon the United States disappearing carriage, one of the greatest advancements in modern ordnance. This carriage was invented by Gen. A. R. Buffington and Capt. William Crozier, both prominent officers in the Ordnance Department of the United States Army. This disappearing carriage is universally considered superior to any other carriage for high-power guns that has been tested or adopted in this country or abroad, and holds the record of the world for rapidity of fire.

With a 10-inch gun mounted on one of these carriages, which required for each loading of the gun the handling of 250 pounds of powder and a 500-pound projectile, together with the general manœuvring of the carriage, a record of ten rounds in fourteen minutes and forty-two seconds was made. This record was made only a short time after the carriage had been adopted for service, and we can thus expect still more marvellous results with this piece of ordnance in the regular practice of the artillery at the different fortifications.

This record was not made by one of our 3.2-inch field guns or even a 5 or 7 inch siege gun, but by one of the heaviest guns in the service, weighing over 30 tons. With six of these great guns mounted in battery closely guarding a channel which leads to one of our many great seaport cities, and firing with the rapidity and accuracy given, and dropping these 500-pound armor-piercing projectiles filled with high explosives on and around the vessels of the approaching fleet,—to say nothing of the batteries of 12-inch guns and mortars with their 800 and 1,000 pound projectiles,—it is not hard to imagine the results of an attempt to pass these defences.

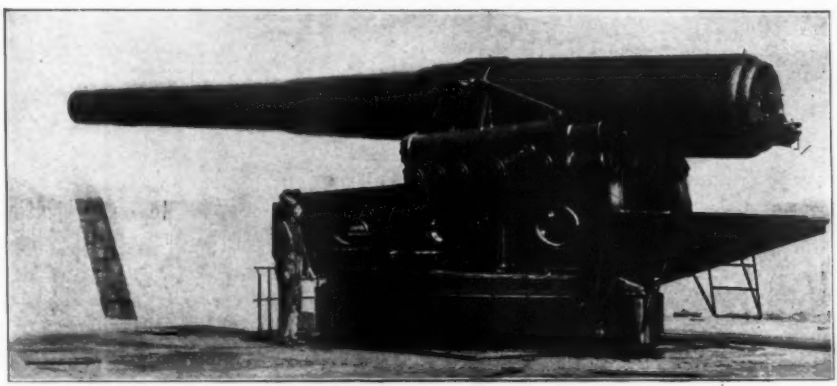
At Sandy Hook, which guards the approach to the harbor of New York, are

already mounted many of these great guns of the largest calibre, with other emplacements being steadily built for the other heavy guns necessary to complete the defences of New York as planned and adopted by the army.

Mounted on one of these disappearing carriages, only a very small portion of the gun is exposed to the enemy, and then only at the moment of fire, the gun immediately disappearing from view behind the emplacement to be reloaded and aimed for the next shot, while at the same time the other guns of the battery are doing their destructive work. During this firing the fleet of the enemy is necessarily in full view of the land defence, and the greater the size and strength of the fleet, the better for the defence, as it gives a greater size target for attack. While the fleet is in full view of the fortifications, the latter are concealed earthworks with the guns completely hidden, and so built as to easily resist the penetration or other damage of any projectile from any calibre gun on any naval vessel afloat.

We have not as yet had a chance to show, not even during our war with Spain, the great power and strength of our modern defences. But by a little thinking we might get a very clear idea of what this strength would be from the results of the attack of a most modern navy against old Morro Castle at Santiago, an old-fashioned stone defence built in the sixteenth century, protected almost entirely by old brass, muzzle-loading guns, which held itself against the fire of the enemy and stands now in as good a condition as before the day it withstood the fire of the American fleet. When compared with this old sixteenth-century fort, defended with guns of the same date, which, upon arriving from Cuba, were sent to the Omaha Exposition as old relics and curiosities, what may we judge of our present fortifications, built on the most modern and advanced principles of coast defence, and with the modern great guns?

Another gun of exceptional importance in our harbor defence is the 12-inch breech-loading, steel mortar, probably the most destructive of our present coast-defence guns, and from records made by our troops during their regular target practice of remarkable accuracy. These peculiar guns are used where a very high angle of fire is required, where it is the intention to strike and penetrate the deck of a war-vessel. The projectiles used with the 12-inch mortar are known as the deck-piercing and the torpedo shell. The deck of a battleship being so thin, from two and one-half to four and one-half inches, is very easily penetrated by these projectiles which carry from 80 to 102 pounds of emmensite or gun-cotton. These projectiles weight 1,000 pounds each. As the walls of the torpedo shell are thinner than those of the deck-piercing shell, it is en-



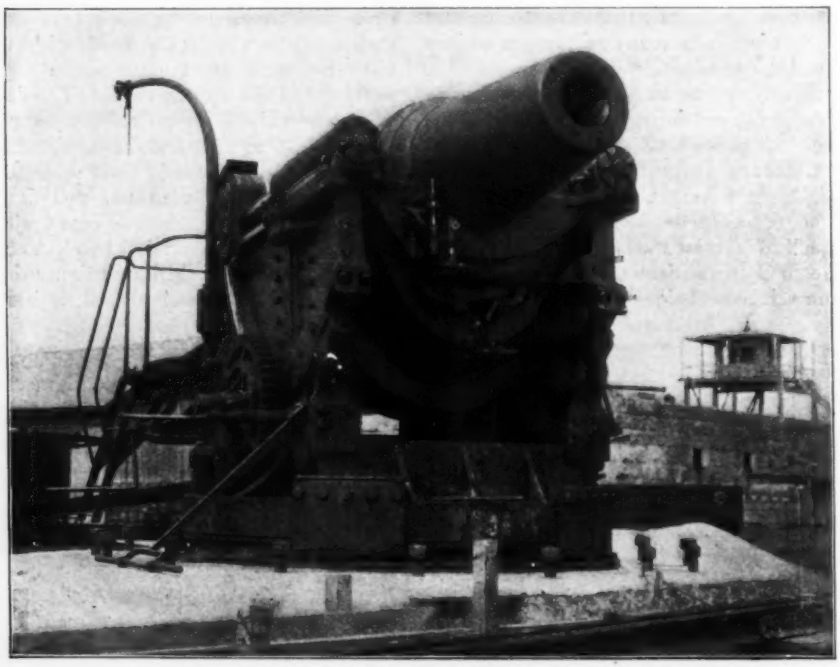
U. S. ARMY 12-INCH COAST-DEFENCE GUN MOUNTED ON MODERN FORTIFICATION.

abled to carry a heavier charge of the explosive. Of these two projectiles the former is used more for destruction on the exterior of the vessel, while the latter does its awful work after reaching the interior, among the machinery, the boilers, the ammunition, and the men. Any one of the most heavily protected battleships afloat, if struck squarely by one of these terrible missiles, would be as completely demolished as the battleship "Maine," the broken skeleton of which lies sunken in the harbor of Havana.

The accuracy of these guns is as marvellous as their power. This has been clearly proven by targets taken at sea at ranges varying from four to six miles (the mortar is generally used at ranges of from three to five miles), during which target practice twenty rounds were fired, and out of these twenty, thirteen shots struck the target. From this record we may well judge as to how great would be the destructive power of these mortars when mounted, as they are, in batteries of sixteen, and having instead of one boat for a target an entire fleet.

These guns are steel hooped and built on the same principle as the 8, 10, and 12 inch guns, and require the same accuracy in manufacture. On account of the great weight of these mortars and the high angle of fire used with them, it has been found impossible to build any battleship of sufficient strength to carry one and use it as one of the battery of heavy guns.

Such, then, are the means provided for the defence of the commercial cities of the Atlantic and Pacific coasts.



U. S. ARMY 12-INCH BREECH-LOADING COAST-DEFENCE MORTAR AND CARRIAGE.

THE WHITE ROSE MYSTERY.

By Edward Olin Weeks.

"And there was a Greek, an archon, condemned, because of making a bush to bloom with roses of fire, to wander the earth over for more than a thousand years."—*Old Writer.*

One afternoon in the month of May I sat in my office looking over the details of some very dry detective work. Occasionally, for relief, I looked out of the window at the spring sunshine flooding the street, and then I turned once more to my task. But finally I pigeonholed the papers, with an exclamation of contempt. The case had grown old and ugly, and I had lost my love for it. I touched the bell on my desk, and my right-hand man appeared. Of him I inquired who had called in the early morning, leaving word that he *or she* would call again in the afternoon. When he first mentioned it, the incident had seemed unimportant, and so had escaped my attention.

Betty glanced at the clock before he answered:

"It was a lady, sir, and if she is true to her word, she will be here in fifteen minutes."

This was a diversion, at least, and I placed my desk in order and awaited my coming client.

She kept her appointment, for in a quarter of an hour Betty delivered her card, on which was the neat superscription, Mrs. Helena S. Belmer. A moment later, and a beautiful young woman in deep mourning entered my private office.

After the first formalities of the visit were over, there was still some hesitancy upon her part to state the object of her call, and, to reassure her, I said briskly:

"Now, Mrs. Belmer, I am ready to hear the particulars of your case, for I assume you have some matter requiring my attention."

She tapped nervously on the arm of her chair, while she looked down to the floor in doubt.

"Mr. Glen," she said, "I have come to see you about a strange flower;" and

with these words she scanned my expression anxiously, as if she feared that a man of practical purpose would reject her case at once.

To speak frankly, I *was* surprised. A flower, plucked or growing, is a thing so fragile, so ephemeral, that I really could not apprehend what a detective could be asked to do in connection with one; but I did not allow my wonder to appear by look or word.

"A strange flower?" I said, smiling. "Please tell me all about it."

And Mrs. Belmer then told her story in these words:

"When I was a child, Mr. Glen, my mother died, and soon afterward my father. He left me some means—enough to provide for my education.

"On coming of age I was married, and my young husband invested our money in business. Three years later his death occurred, and I lost all I had through the incompetence of his partner. Since then I have supported myself and my two little girls by dressmaking. This I tell you in candor, that you may know at once that I am not rich. I have some wealthy ladies on my list of customers, and I am able to live in a comfortable home; yet, after all, I have only my living and a little ready money.

"I have not come to you with the idea of paying for your services at full value, but simply to offer what I have in hand—one hundred dollars. To explain my case, I must tell you that a month ago a wealthy young lady purloined from my apartments a rose-bush in bud, and that I know of circumstances now which may lead to its return. I am fitting Mrs. Herbert, the wife of the Broadway florist, with a gown, and this morning she said that at nine o'clock to-night a party of experts would visit her husband's place to inspect a wonderful white rose belonging to a Miss Envor. That is not the name of the young lady who stole my bush; but this I know—the flower on exhibition is mine. And now, Mr. Glen, will you undertake to recover it for me?"

An instance like this had never occurred in all my detective experience. I looked at Mrs. Belmer while my mind passed her statement in review, and she in turn gazed as steadily at me.

"Allow me to ask you a few questions," I said. "Does the lady who purloined your rose still come to see you?"

"She does. She knows that I suspect her, and yet she has given me more remunerative work than ever before. She is a lovely young woman, generous and high-spirited, and I have not had the heart to mention the theft; and she, of course, would not be the first to speak."

"Have you any idea, Mrs. Belmer, of the commercial value of your bush? Admitting that it is rare, what do you think any one would give for it—this lady, for instance?"

A cloud passed over my client's face when I asked this question. She moved uneasily in her chair, and in her dark eyes was a disturbed expression.

"Mr. Glen," she answered timidly, "I did not suppose that you would question me on this point; but I will tell you that a few days after the young lady had carried away my rose-bush, she came into my apartments hurriedly. She said she had only a moment to spare, but that in passing she desired to pay my bill, amounting to fifty dollars. 'Here is a check,' she said, laying the slip of paper on my table. 'Never mind about a receipt.' And in a moment she had gone. When I looked at the check, I found it was drawn for five hundred dollars!"

"And what did you do about it, Mrs. Belmer?" I inquired rather sharply.

"I returned it to her at once."

I am sorry to say, knowing now the facts to follow, that I allowed some doubt of my client's sincerity to appear in my next question.

"What am I to think from this, Mrs. Belmer? Did you regard five hundred dollars as too much, or not enough?"

My client looked at me in dismay.

"Oh, Mr. Glen," she said, earnestly and entreatingly, "I know now what you do think. You think that I would use your services to extort money—that I am

an adventuress. All this you think, I am sure!"

And with this outburst my client began to cry.

In a moment I saw more than all my questions had brought to light. I saw that she was the victim of a stranger and stronger influence than had appeared in her statement of the case.

"Mrs. Belmer," I said, not without regret, "we have mistaken each other. I really credit you with a sincere purpose, and I shall certainly not forsake your cause; but I must know the facts. You can see for yourself that I am only seeking proper ground upon which to work. In a practical sense, I do not feel sure that you have been robbed by your customer of a thing of value. In a way, roses are common flowers. Mr. Herbert would sell you a magnificent bush for twenty-five or thirty dollars. Then admitting that your stolen plant is rare indeed, we must also admit that five hundred dollars is a large sum of money. The culprit has shown that she would gladly pay that amount to compensate you for her misdeed. So, why not accept the exchange and settle the case without my aid? Certainly, that would be a direct way out of the affair. Do you not think yourself that what I say is reasonable?"

In matters of mystery or sentiment, a logical statement may complicate difficulties instead of dispersing them.

My client sprang from her chair, pacing up and down the room like a person vexed to distraction. While I sat looking on, a feeling of sympathy touched my heart. It must indeed be a powerful influence which affected her with such intensity. Truly, I found my interest in her case growing stronger.

At length, weary with the struggle, she sat down, her attitude drooping and dejected.

"Mrs. Belmer," I said, waiting to receive her attention.

She lifted her eyes to mine very slowly.

"I will ask you only this question: What is the strange influence of your flower?"

Leaning forward eagerly, she said: "Mr. Glen, believe me, but do not urge me to say more than this: my rose is not an earthly plant!"

With this remarkable answer, I must record it as a fact that I felt a singular impulse stir me to action. I shook myself with a leopard-like eagerness to be up and doing. I gave my client distinct particulars for her guidance. I hurried from my office, after terse instructions to my clerk Betty to await my return prepared for the accurate execution of my orders. My first visit was made to the floral repository of Mr. Herbert; from thence I went farther up-town to confer with the manager of a theatre; then I returned to my office, and gave Betty and my client their final directions. It was then not far from six o'clock.

Three hours later, and I passed through the doorway of Mr. Herbert's place only a step behind the four gentlemen who were invited to give their opinion of the bewitching rose-tree.

The proprietor advanced to meet us as we entered. To the gentlemen he said: "I am pleased to see you. Everything is ready." He then called their attention to me, adding to his words of introduction these of explanation: "Mr. Glen is my friend, and I have asked him to be present, for I know he will appreciate the wonderful rose you have come to examine.

"But before you see it, gentlemen, let me mention certain particulars. The owner is a charming young lady. She brings the flower to me with many strange fancies. She speaks of the vigils of the plant. She says it sleeps by day and watches by night. She has read many romances concerning the Dutch tulipomania, and her faith in the honesty of lovers of flowers is badly shattered. She would tremble for her bush if it were locked up in a place of safe deposit. She stipulated, for instance, that in no circumstances should her white rose be left for a moment in the dark. She made other queer requests which I need not mention. I desire to make it plain to you, however,

that she cannot rest with her light beneath a bushel.

"She is determined to outshine us all. She solicits your opinion, yet fears to have you know who she is. Even my assistants know her only by the assumed name of Miss Envor."

"This whole affair is *sub rosa*, then," said one of the judges, smiling.

"I will thank you to so consider it," Mr. Herbert answered seriously.

The four gentlemen looked at one another in evident wonder. I could see that they were eager to view this flower so carefully shrouded in mystery. They began to show signs of impatience.

"I have mentioned these particulars," Mr. Herbert added, "that you may understand this peculiar case. It is now a little after nine o'clock. At a quarter to eleven the young lady, coming from the theatre, will call for her plant. In the intervening time you will have an opportunity to give her the favor of your opinion."

The gentlemen said they were ready to make the inspection at once.

Of the four, three were very wealthy men, who had been known to sign large checks for rare exotics. The fourth man, as I afterward learned, was considered the best judge of roses in New York. He alone appeared to doubt what he had heard of the white rose.

"I am willing to wager a new silk hat with you," he said to Mr. Herbert, "that your unique flower is only an old French variety revived. In the old books where I have seen it described, it is said to be very rare, because it is very delicate. It thrives best in odd places and under odd culture. Perhaps some traveller, visiting an out-of-the-way nook in France, comes upon the blooming and healthy plant. Never having seen it elsewhere, he immediately proclaims a new sort. But let me tell you, he is disappointed in proving his assertions, for on removal from its native soil the bush invariably dies!"

"It would not be fair to accept your challenge," Mr. Herbert said with pointed emphasis, "for I have seen the white rose."

With these words he led the way to an apartment crowded with costly plants, and having the atmosphere of a hothouse. We followed him behind a screen formed of a double row of stately palms, and then, in silent amazement, we came to a halt.

From a pot of antique earthenware, green with age, which stood upon a column of spotless marble, ascended a tall bush, its glorious sprays drooping with half-open buds and a few full-blown roses—all tremulous, ghostly white, and virginal. There was also a delicate perfume in the air—a perfume so unusual that I know of nothing to compare it with, other than the earliest scent of the trailing arbutus rising in our northern woods through a soft covering of snow.

Even as one not initiated in the mysteries of floriculture, I knew that I was standing in a strange presence, and I looked curiously at my more learned companions.

The expert was speechless with admiration and perplexity; the other gentlemen said not a word. The oracle being dumb, they must not speak.

Not far from my hand was the switchboard controlling the electric lights of the room.

Why did Mrs. Belmer call her plant unearthly, and why did Miss Envor fear to have it left in darkness?

With an upward motion, as if quite by accident, I cut off the current, and the apartment passed from day to night. I shall not soon forget what followed. Before, the place had been crowded with rare plants; but now, supreme in her sovereignty, the strange white rose stood alone. A pale light was seen shining from the flowers; illuminating the leaves of the tree, it threw a wavering lustre over the polished shaft of the pedestal. In the silence I could hear the gentlemen breathing softly, as if in fear that the vision would disappear with the slightest sound.

Apologizing for my awkwardness, I replaced the switch.

The expert turned to Mr. Herbert, asking for a word apart with his friends. When they returned, he said eagerly:

"Sir, it would be useless to disguise our

opinion. This plant is rare indeed—unrivalled—the very queen of the roses. If your customer will sell her flower, she has simply to name the price."

The florist shook his head in doubt. He looked from face to face, while he carefully weighed his words. At last he answered:

"Gentlemen, if any one of you owned that bush, ten thousand dollars would not buy it."

"That we are ready to admit," the expert replied; "but these gentlemen have agreed to this: they are willing to buy the plant conjointly, each one to pay a third of the value. In other words, if the lady will accept fifteen thousand dollars for her rose-bush, root and branch, she can have the money."

Mr. Herbert again shook his head in doubt.

The five gentlemen then withdrew behind the shelter of some tall plants, leaving me to stand alone near the silver tree.

Now and then I heard odd parts of their conversation: the expert arguing methods by which Miss Envor could be induced to sell her rose; the florist citing in rebuttal her passionate love of the flower, her wealth, her firm character—all proof against the temptation of proffered gold, no matter how large the sum.

But while I stood passive, the other gentlemen, like enthusiasts, became more and more involved in their debate. Time flew by them unheeded; or, to speak more accurately, Mr. Herbert seemed indifferent to its flight. I looked at my watch. The hands pointed to half-past ten. I have known, in the course of my experience, more than one important event occur in a minute of time.

What I shall describe now occurred in less than a minute. I glanced at the door by which we had entered, and I saw that it was slightly ajar.

In a moment a very beautiful young woman stepped over the sill. She was becomingly apparelled. She was tall, graceful, and very pale. She had large brown eyes and a wealth of dark and shining hair. She walked to the middle of the greenhouse floor, looked with hesitation in the direction of Mr. Herbert's voice, made a pretty little motion of perplexity or vexation, then went to the spot where her flower stood, lifted it from the pedestal, wrapped it about with a light scarf which had been hanging upon her arm, returned swiftly to the street, and there entered a cab in waiting, and was driven instantly away.

Through the now open door I saw the girls in the office, or salesroom, tying up bunches of flowers for a number of ladies and gentlemen who had come in from the theatres. The young man in charge of the office was assisting them. No one had observed the entrance or exit of the lady.

I felt a touch upon my arm, and turning about I found Mr. Herbert at my elbow.

"Mr. Glen," he said, with an appearance of great discomposure, "what has happened to the white rose?"

Behind him stood the four gentlemen, actually astounded. Pointing to the dial of my watch, I explained the matter to them.

"Gentlemen," I said, in conclusion, "it was not my business to detain Miss Envor if she came before the appointed time."

"Certainly," Mr. Herbert said, "any blame in the affair, if not right, must attach to me. Miss Envor is tall and graceful; she has black hair and large gray eyes. Does that description apply to the lady who took the flower?"

"In a measure," I replied, "with the exception of her eyes, which were brown."

"Gray eyes often appear dark at night," said one of the gentlemen, who was a banker.

"I know that to be a fact; for once, under press of business, we employed a young man after banking hours to assist us with our accounts. We entered his description in a book kept for the purpose. We did not see him in daylight until the following Saturday afternoon, when we were surprised to find that he had fine gray eyes."

"So far, then, it seems to be a question of eyes," said the expert. "As it pertains to his business to observe such particulars, we must assume that Mr. Glen is correct. What circumstances can you recall, Mr. Herbert, to prove that Miss Envor's eyes are gray instead of brown or black?"

Mr. Herbert stepped to the door, calling out to his assistant: "Myron, what is the color of Miss Envor's eyes?"

"Blue!" said that young lady herself, as she entered the office.

The florist turned to us with an expression of dismay.

"Gentlemen," he said in a low tone, "you must help me through with this difficult affair. Miss Envor," said he aloud, "please walk in here; these are the judges who came to examine your rose."

He then introduced us to her, deliberately, one by one. Afterward he closed the connecting door, snapping the spring catch into place.

An oppressive silence followed. Mr. Herbert was very nervous, and the other gentlemen were sympathetic; I alone felt undisturbed.

"Miss Envor," I said, "allow me to explain matters. Mr. Herbert introduced us to you 'inadvertently' as the judges of your plant. These gentlemen are the judges; I know nothing about flowers. But it happens to be my duty to inform you that the white rose is not in Mr. Herbert's possession at this moment."

"And why is it not in his possession?" asked the lady, flashing an indignant glance of inquiry at the circle of disquieted faces.

"Because, madam, it was removed by a person claiming to be the rightful owner. Do you know of any one empowered to make that claim?"

As I asked this question it would not have been easy to decide upon the color of Miss Envor's eyes. They appeared as black as night.

"Who is this man?" she inquired of Mr. Herbert.

He stepped forward to speak, when I interrupted him.

"Madam," I said quietly, "I am known as Detective Glen."

The beautiful culprit turned pale, but was still defiant.

I could not avoid admiring the direct glance of her flashing eyes and her spirited attitude.

"Miss Envor," I continued, with gentle emphasis, "it is perfectly useless to assert that you are the rightful owner of the white rose. I do not wish to add to your present trouble by stating how the rare plant came into your possession. The fact that it is not in your possession now must sever your connection with it. If you have anything to say, however, which will more fully determine these gentlemen not to mention a word of what has happened here to-night, I am sure they will accord to you their respectful attention."

Miss Envor's lips trembled and her eyes grew moist.

"Gentlemen," she said appealingly, "I was not less than mad! After I had gazed for the first time upon its silvery glory, that unearthly flower came to me in my dreams. I could not rest. By wrongful impulse I made it mine, and then alternate hours of rapture and sorrow followed. But now, if you will keep faith with me, I shall feel once more like my innocent self; indeed, I shall be grateful for freedom, for I have been in chains, though the links were made of flowers."

She bowed to us with pathetic grace. She moved away toward the door. Mr. Herbert opened it, escorting her to her carriage.

The gentlemen looked at one another, as if some one ought to speak.

The expert turned to me: "Can you say, Mr. Glen, whether the white rose is now for sale?"

"If you renew the offer made to Mr. Herbert," was my reply, "I will endeavor to secure my client's acceptance."

He looked to the three rich men for authority. They nodded assent. "We are agreed," he answered.

On the next day I called early upon my client. A pretty maid-servant opened the

door, and having ushered me into a small reception-room went quickly to announce my name to her mistress. In a few minutes I heard Mrs. Belmer's footsteps upon the stairs, and I arose to await her entrance.

After my experience of the night I could appreciate the full influence upon her of the rare plant, and I felt a certain hesitancy in speaking of its exchange for even a moderate fortune. With the choice offered, which would she accept—the fortune or the flower? Really, I had my doubts.

"Mrs. Belmer," I said, "after you had carried your rose away last night an offer was made for it of fifteen thousand dollars. Excuse me if I seem to give advice unsolicited, but I would certainly accept the money."

She looked at me in profound amazement, inclining her head slightly, as if to hear me repeat the words. I did so. Even then she did not answer. She passed her hand over her forehead with signs of great perplexity. She drew her children, who had come into the room, closer to her side, and at last, with a passionate burst of tears, said:

"Mr. Glen, I cannot sell the white rose!"

For a minute or more I was perfectly silent. Like Miss Envor's, this was surely a case of desperate infatuation.

Mrs. Belmer turned her streaming eyes upon her children. She seemed to think only of them. Her agony and uncertainty of mind increased with the passing moments. Finally, with a great effort, her face flushing beneath her tears, she said:

"Mr. Glen, I must speak the truth at any cost. I must tell you this—the white rose is not mine. I took it covertly from some one else—from a poor old man, from a bent and trembling Greek."

With this confession she covered her face with her hands, crying bitterly.

"Surely," thought I, "while this lady's case is one of Fortune's freaks, I must admire her sense of honor. Perhaps I can yet secure for her the legitimate ownership of the flower."

When, with this purpose in mind, I looked up, I saw my client's eyes, though still dim with tears, gazing frankly at me. Like a true woman, the worst of the storm past, she was smiling through the clouds.

"Mrs. Belmer," I said, "we must start over again. Tell me now how the white rose came into your hands."

Her face turned sad in a moment.

"It is so easy to fall into temptation," she said. "Sometimes we have only an instant in which to make our choice of right or wrong. Almost before I knew that I wanted to take the flower, the deed was done.

"One lovely morning in April I was sitting in this room. My servant was sweeping, and the street door was open. Suddenly I saw a strange old man standing in the hall. On one arm he carried a plant, loosely wrapped in moss; on the other, a small folding-tray of polished wood, exquisitely inlaid with metal figures of men and women, nymphs and satyrs. He seemed to me like a person a hundred years old. He was thin, round-backed, and trembling with a shaking palsy. In the deep hollow of his chest fell a long white beard. He had a full brow, regular features, and sorrowful eyes. I inquired what he wanted. He stood the flower-pot on the newel of the staircase and then threw open his tray. It was divided into compartments, and in every one was a perfect gem, evidently a rare antique. The old man was so feeble, so poor and threadbare, that I could not understand his possession of such treasures. I questioned him. He said he had been making the collection all his life in Athens; but now, in his old age, was ostracized and must sell the gems to live.

He begged me to buy two flame-colored stones and have them properly mounted in gold for ornaments in my hair. Worn above my temples, so he said, they would transmit to my eyes a clear light and a rose-like hue to my cheeks. I did not believe a word of that, of course, but I purchased the drops for their own great beauty. The price, he said, was one hundred *oboli*. I had in my pocket a shining quarter-eagle,

and I gave that to him, and he seemed satisfied.

"In the meantime the April wind, blowing in through the open door, had loosened the mossy wrapper of the plant on the stairpost, and a single bewitching bud of the white rose peeped forth.

"I looked down at the aged man. He was bending over his tray, his shaking hands with difficulty rearranging his disordered treasures. Once more I looked at the tempting bud. I stretched out my hand to touch it. It shrank from my fingers like a mimosa, yet brightened their tips with starry fire. An irresistible desire to own the parent tree possessed me.

"The old man had now arisen from his stooping posture. I stepped between him and the bush, hiding it from his view, for I had seen in his eyes a vacant, forgetful stare. He stroked his long beard for a moment with his thin and trembling hand. He looked around him like a person in a dream; then he shook his white head sadly, and so turned away, with a slow, majestic motion of farewell.

"An instant later, when I glanced up and down the street, he was nowhere in sight. I closed the door, and kneeling before the white rose I wept the bitter tears of shame. Within a few days after that the young lady called by you Miss Envor robbed me of the plant; but I blame her less than myself, for I am guilty in a greater degree. And now, Mr. Glen, I can only beg that you will replace the white rose in Mr. Herbert's care, and restore it, if possible, to the rightful owner."

"There is one point in your story," I said, "of singular interest. The flame-colored stones—can you show them to me?"

My client shook her head.

"The gems disappeared," she replied. "I have not seen them from that hour to this day."

Her answer confirmed a theory of mine, but I did not again refer to the matter.

I returned the white rose to Mr. Herbert's custody. This was interpreted by the wealthy men as a sign of the eventual acceptance of their offer.

Well pleased that they should so consider it, I immediately began a search for my client's bent and trembling Greek; but neither by day nor by night, nor by any means whatever, could I find a trace of the old man of Athens.

The month of May was now drawing to a close, and our floral anniversary, fittingly named Decoration Day, was approaching. It had been my intention to go out of town on that date, but circumstances connected with the white rose kept me in the city.

Not satisfied with two lovely victims, the seductive plant sought now for one of sterner mould.

I received a call from the banker. As this gentleman had been the least demonstrative of all the group, I felt curious to learn the object of his visit. Without waste of words he said:

"Mr. Glen, I have determined, if I can, to give a more unique entertainment than any ever known in New York. Speaking for your client, what compensation will you require for the exhibition of the white rose at my house for one evening?"

After reflection I replied: "Sir, there will be no charge for the favor you ask."

The banker looked at me in surprise. Expecting objections to his proposal, he had come prepared to meet them with the Midas-like touch of the millionaire.

"I did not come to ask a favor of you, Mr. Glen," he said, with brusque directness. I should want the white rose removed to my house on the afternoon of Decoration Day, with every precaution taken for its security and protection. Leaving that part of the affair in your hands, the only question to which I want answer is—your price."

"Sir," I replied just as brusquely, "this is not an every-day transaction. Let me tell you without hesitation that I consider the white rose a mystery. I will take upon my hands no responsibility connected with it other than that of its present state. If you are disposed to exhibit the wonder to a number of your friends, under a strict pledge of secrecy, you have my consent;

but it must be done at your own risk, and, in my client's interest, I must be absolutely secured against any possible loss of the plant."

"What is your requisition?" he asked.

"That you deposit with the cashier of a reputable bank a check made payable to my client, in the event of any harm to the white rose, the amount of the check to equal the fixed value of the bush—fifteen thousand dollars."

"Agreed to," said Midas. "Is that all?"

"Not quite; I must have three invitations to your entertainment—one each for Miss Envor, my client, and myself."

"Granted with pleasure, and as a matter of course," he assented, laughing, and in every particular he was as good as his word.

That the reader may understand what is to follow, it is necessary to say here that the banker's mansion is celebrated for one feature justly regarded as the finest of its kind in New York, and possibly in America. This is a magnificent ball-room, designed for interchangeable use as a private theatre.

In the western end of the great apartment is a lofty alcove having an exquisitely appointed stage, and doors leading right and left to dressing-rooms; the platform is separated from the auditorium by an ornate proscenium arch and embroidered drop curtain.

On the eventful night, then, of May 30, 1894, the banker's residence had an outward aspect of mystery. The windows were darkened. Light came but faintly through the inner doors of the vestibule. The whole front of the building appeared silent, sombre, and magisterial.

One by one carriages drew up before the mansion, deposited the invited guests, and then made way for more to follow.

A young Japanese, clothed in native costume, and wordless as a mute, received the visitors and guided them to the entrance of the theatre, where they were met by an usher of the same race and quietly assigned to seats. Only a dim light was in the apartment. A pure aroma, exhaled by hidden flowers, made the atmosphere sweet but oppressive.

The carriage containing the two ladies it was my honor to accompany was not the first nor the last to arrive; but by ten o'clock the assembly was complete and the doors were closed.

These secret preliminaries to this Arabian Nights entertainment had affected the audience with emotional power.

My own companions, those charming women who had been made to bow their queenly heads to the mysterious rose-tree, sat by my side, pale and attentive, their eyes shining liquidly in the dusk.

Somewhere a clock with a silver bell pealed the hour of ten, and then the quarter past; somewhere a number of stringed instruments gave a faint and distant prelude. The curtain rolled slowly up, exposing to our view a remarkable spectacle.

The whole stage appeared thronged with a grouping of magnificent flowers. In a burst of argent light, rank upon rank, with leaves of every shade of green and blossoms of every imaginable hue, they ascended beyond our line of vision toward heaven; yet so artfully had they been arranged that all appeared to lean toward a common centre and look down upon a scene of surpassing interest. There was a human expression of wonder about the delicate things that somehow seemed to presage the coming event.

The assembly was agitated by a sigh of satisfaction, which turned to one of regret as the curtain fell. Questioning glances were exchanged. For what grand tableau could this costly and exquisite setting have been planned?

Again the distant orchestra was heard; now it played Rubinstein's sweet accompaniment to the song—

> "Thou'rt like unto a flower,
> As fair, as pure, as bright."

Once more the curtain lifted. In the middle of the stage stood a young girl, clothed with the simple and spotless drapery the Greek statuaries have made ad-

mired the world over. Through the transparent folds of her radiant robe could be seen the undulations of her perfect form; her robe was fastened by a brooch over the right shoulder, but her left arm and faultless breast were bare; on her feet bright sandals glittered; around her white throat was a necklace of fiery pendants; her zone was of gold, and the fillet confining the heavy braids of her jet-black hair was set with pearls; her grand dark eyes were large with wonder, and on each pale cheek was the color of a delicate blush; in her hands she held a wild profusion of loosely gathered flowers, and many buds and blossoms had fallen to the floor.

From high above her head came a quick shower of petals, as if descending from a blooming tree shaken by the wind, and then this lovely being faded darkly away, and where she had been standing appeared the white rose!

In the serenity of its own pure light, in its pot of antique earthenware, on its slender Ionic column, it seemed by magical transformation to be a blending of flower and girl. I could now understand what Miss Envor had said of the vigils of the tree. Its flowery children appeared like those of human kind: some were half awake; some were like maidens arisen early and arrayed in the snowy vestures of the morning; some moved like infants smiling in their sleep—all were tremulous with waking life, and from all came a perfume indescribable, or not less fragrant than the pollen cast upon the air by the ever-humming wings of the bees upon Mount Hymettus. But now the tree shakes.

On my arm Mrs. Belmer lays her slender hand, and I see standing upon the stage in his uneasy ague and decrepitude her bent and trembling Greek!

To him the silver bush pays its obeisance. In the pearly heart of every half-open bud and full-blown rose appears a spark of glowing fire; on the tip of every shining leaf a point of astral light.

In the illusive splendor the aged man's infirmities seem to pass away. He stands erect. In the place of his threadbare garments we see a long cloak, or palla, of dusky green, with an embroidered hem of purple and gold. About his brow is a jewelled band, and, lo! on either temple is the glare of a flame-colored stone!

With a rapt expression upon his noble face, with one hand outstretched in commanding majesty, the stately archon stands, while the glorious rose-tree sheds around him an opalescent glow. But the vision becomes less and less distinct. Light fades away from the snowy head and its flaming gems. Darkness follows, and the curtain falls.

The Japanese attendants threw open the doors and the assembly dispersed. Miss Envor, Mrs. Belmer, and myself alone stood waiting. Presently the banker came from the direction of the stage. His face was pale but calm, his manner abstracted.

"Sir," I said, "you are surely a magician."

"Mr. Glen," he answered, "I know no more about this mystery than these innocent ladies. The natural display of flowers was mine, but the Greek girl and the venerable archon came—from I know not where!"

"And the marvellous plant," I asked, "what of that?"

"On the floor and pedestal," he replied, "nothing remains of the strange white rose save an impalpable powder—the veriest ashes of roses!"

Assuredly, thought I, this must have been the Appearance of the Ancient Greek and the Luminous Flower, that unexplained and unexplainable mystery.

A REVERIE.

THE lights were gleaming softly on a hushed, enraptured throng,
And the theatre was ringing with a flood of silver song:
A spell of wondrous melody charmed soul and sense and brain,
And my listening heart was thrilling with the magic of the strain.

I closed my eyes and wandered back to a well-remembered day,
And heard in sweeter, dearer tones that old familiar lay;
I saw again a girlish face, with eyes of melting blue,
And rosy lips that trembled as the song welled sweetly through.

The weary years of hope deferred, with all their load of woe,
Were banished by the spell that woke the thoughts of long ago;
The past came back, the cruel grave gave up its dead again;
Once more I heard my darling's heart thrill through the old refrain.

"Remember me!" Ah, yes, my love, though years have rolled along.
This heart has not forgotten yet how you once sung this song;
And though the silence of the grave has stilled each silver tone,
And, reft of love and hope and you, I roam the world alone,
Yet ever and anon I hear your voice and bless the song you sung
When love and life went hand in hand, and you and I were young.

The singer ceased—I woke again—my blissful vision fled,
And darkness gathered o'er the grave where youth's first love lay dead;
The music of the past was lost in discords of to-day,
Yet its echo lingers with me though the voice has passed away.

GEORGE CHETWYND.

LIP READING.

FEELING THE VIBRATION OF THE VOCAL CORDS FOR THE SOUND OF THE LETTER "M."

By Mary Hare.

Photographs by R. C. Ryan.

The teaching of deaf and dumb children, in spite of so much that has been said and written upon the subject, still appears to be a mystery to the majority of people in this country, and more particularly does it seem impossible for them to understand that they can be taught to speak.

The deaf—or, to call them for once by the more familiar title, the deaf and dumb—can be taught to speak, and are taught now to a large extent by what is known as the *oral method*. This is by no means the only method used in their instruction. There are three ways at present in vogue—the system which teaches entirely by signs, or the manual alphabet and writing; that which teaches entirely by speech and writing, known as the oral method; and that which makes use of speech, the manual alphabet, signs, and writing, and called therefore the combined method.

Previous to the latter part of the eighteenth century these different styles of teaching, in a more or less crude form, were used indiscriminately throughout the countries of Europe, in *isolated* cases only, no one apparently considering it necessary to do anything for the deaf as a class. They were ill-treated, scorned, neglected, according to the character of the age and country in which they lived, in some cases even being put to death, the opinion being almost universal that to teach them was a hopeless task. Here and there, however, would arise a man or woman with ideals above his neighbors, who would devote his life to one, two, or three deaf-mutes as the case might be; others again, from mercenary motives, would do the same; but the total in any case was a miserably small one, and the bulk of the deaf were left to grow up in absolute ignorance of everything.

It is France we have to thank for the first practical philanthropist who gave himself up, not to one deaf-mute, but to all who chose to come to him, poverty being their passport instead of their bar as in the past.

In a narrow old-fashioned street in Paris, just where it widens a little, stands now a commodious building, surrounded by its own gardens; in the courtyard within the entrance gates is a statue raised to the mem-

ory of this man, the Abbé de l'Epée, whom all the world now honors for his life-long devotion to the deaf.

To-day in this institution are to be found 300 deaf boys, thanks to the work begun for them nearly one hundred and forty years ago by the Abbé. His interest in the deaf was first aroused by his accidental meeting with two deaf and dumb sisters. Finding they had no means of communication, and, as he said, no one to give them any idea of religion, he decided to teach them himself, and ere long he had no less than sixty pupils, the greater part of his not too liberal income being set aside for their support. Having no previous knowledge of the subject, he studied eagerly whatever books had been written upon it, and even taught himself two or three other languages in order to read books published in them, finally deciding that for his numbers and the limited time at his disposal, the sign language was the most practicable. For this reason the sign and manual system was long called the "French" system, and, owing to the Abbé's enthusiasm, it spread rapidly over France and other countries. Could de l'Epée return to the scene of his former labors he would find a revolution in this respect, for now the whole school is entirely oral in its teaching, and not only this one, but all schools throughout the country.

"A" AS IN FAR.

LONG "A" AS IN ALL.

"OO" AS IN OOZE.

LONG "E" AS IN EAT.

Until the last twenty or thirty years the sign language has been most in vogue in Europe; since then, however, with the opening of one or two purely oral schools, opinion has gradually been changing, and now, although it cannot be said that the *pure oral* method is used very largely, yet all schools devote more or less attention to the teaching of speech, some using this exclusively, others giving it a higher place than the manual, and others again employing it as little as possible.

The system which requires the most skilful teachers is undoubtedly the pure oral system.

Oralists base their assumption of the power of the born deaf to acquire articulate speech on the fact that the vocal organs of such children do not disqualify them from speaking, this seeming to point to the fact that it is the inability to hear which prevents the natural development of language; *i.e.*, by the imitation of vocal articulate sounds, the repetition of which, constantly falling on the ear of an infant, at last arouses in turn the instinct to imitate. This he does with gradually increasing accuracy, until intelligible speech is the result.

The deaf infant, by reason of his infirmity, is cut off from all this, and at the end

of two or three years he is still where his hearing brother began—able to make vocal but inarticulate sounds—and here he must remain unless specially taught, first to articulate and then to use these sounds intelligently as language.

SHORT "A," AS IN AT.

Various preliminary exercises have first to be gone through in order to awaken the child's somewhat dormant powers of attention, perception, and imitation; the length of time to be spent over them varying according not only to his mental capacity, but to the amount of home training, spoiling, or neglect he has hitherto received. Eventually, however, the day arrives when he is ready to learn his first sound, the idea being to teach primarily those most easy for him to pronounce and lip-read. The alphabet, as usually taught to hearing children, is discarded for the present, and the child learns only the phonetic sounds. For instance, to pronounce the sound of "f," his attention is directed to his teacher's mouth, where he sees the upper front teeth lightly resting on the lower lip as in the illustration of the boy pupil.

"M," AS IN MUMMY.

This alone will not enable him to say it; the sense of touch (a most important factor in the instruction of the deaf as with the blind) is next brought into use, and the child's hand is put near the teacher's mouth, in such a position that he can feel the breath on the back of it, his other hand being placed in front of his own mouth to show him that he must experience a similar feeling on that. He thus readily produces the required sound, which, by the way, is entirely without voice, several non-vocal sounds being taught first as presenting less difficulty. The "f" is then written down by the teacher, and read and copied by the pupil, and here we get a sample of the deaf child's first lessons in lip reading, articulation, reading, and writing, which progress simultaneously for the present at any rate.

"L," AS IN LULL.

Another illustration shows the formation necessary for "th"—the tip of the tongue between the teeth; the hand again being called into requisition in order that the breath may be felt.

All non-vocal articulations are illustrated in this way, careful attention, on the child's part, to the exact position of the articulating organs being indispensable, and equal quickness on the teacher's, in order to detect any defect in the sound, or unnecessary exaggeration or distortion of the features. In the illustrations given of various sounds, it has been necessary to some extent to make the child exaggerate the position in order to give an idea,

"SS," AS IN HISS.

"F," AS IN FLUFF.

by means of a photograph, of what is intended. The model used is a little boy eight years old, born totally deaf, now under tuition at an oral school. He was merely asked to repeat the sounds from dictation, and was then photographed in the act.

"TH," AS IN THIS.

In one of the photographs the boy is giving the position of "sh," and in another, that of "ss." After dealing with the more elementary non-vocal sounds, the vowels are taught, and here the sense of touch is most important, the back of the hand being placed on the teacher's throat in order that the child may be made conscious of the vibrations of the vocal cord. This position may be seen in one of the photographs. His other hand is then placed on his own throat, that he may reproduce what he feels at his teacher's.

Some of the photographs illustrate the first vowel sound taught—that of "ä," as in "far"; next is shown "â," as in "all," the same process being gone through. The position of "oo" (No. 4) is a particularly easy one for a deaf child to see and imitate, as may be gathered from the illustration. It is impossible to represent all vowel sounds pictorially, many of them having more than one position. No. 5 gives the formation of "e," that is, what little can be seen outwardly; and the last vowel pictured is "a," as in "at." The short sound of this has also to be conveyed to the pupil by his sense of touch, which leads him, if it has been properly trained, to recognize the difference in the length of the vibrations for a long vowel sound, such as "ē," and a short one like "a."

It takes a deaf child a considerable time to realize that, although he can only understand what is said to him by watching the mouth, and in the early stages also feeling the vibration, other people can, on the other hand, know what is said without using their eyes at all. He thinks very often that all people have to lip-read, and that, consequently, if he covers his mouth or hides it from them, they cannot tell what he is saying.

This was amusingly illustrated one day by a little deaf girl who had been spending the evening with some friends of her teacher. One gentleman of the party, having been greatly interested in her, played with her a good deal, which apparently gratified her, for when her bed-time came she put a hand to each side of her mouth, so that none but her teacher should see (or understand, as she thought), and asked in a very distinct voice, "Miss ——, may I kiss that gentleman?"

"R," AS IN ROSE.

"SH," AS IN SHINE.

"That gentleman" answered the question for himself.

Another more embarrassing occasion was that on which a little deaf boy was being made much of by a lady who was possessed of a considerable hirsute appendage on her chin. Turning round on her lap, so that his back was to her, he remarked, evidently with great amusement, "Lady no, man yes." His teacher at that moment wished his speech had not been quite so distinct.

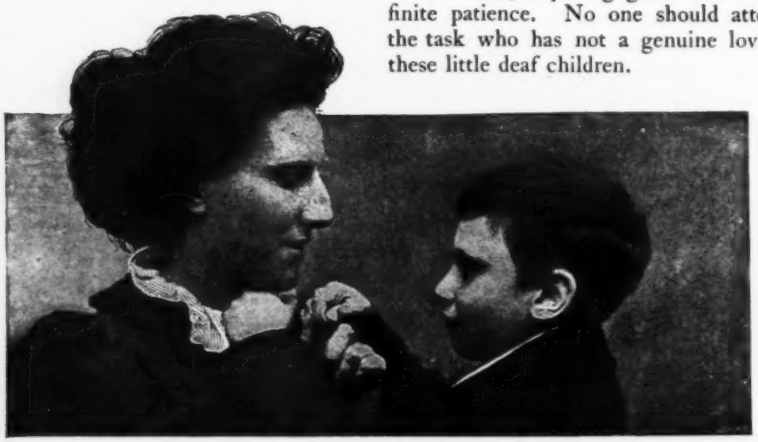
This "broken English" talk has, of course, to be expected, for it must not be supposed that when once the deaf child has been taught to articulate he will then be in possession of a good command of language. On the contrary, every word has to be taught and the meaning explained when necessary; the little ones, consequently, soon get into the way of using their limited stock of words whenever possible, and making them do duty for others whenever they see any resemblance. It is not uncommon, for instance, to hear a little child describe a venerable old man or equally ancient lady as "boy" and "girl," to hear him call his hands "gloves," the cat's paws "boots," and its claws "pins," an angel a "girl-bird," and so on.

Another class of articulations is those requiring the assistance of the vocal cords in their production, such as "v," the method of obtaining which being here illustrated. The pupil must feel the vibrations of the vocal cords at the throat, and his other hand is placed before the teacher's lips, that he may feel the emissions of the breath.

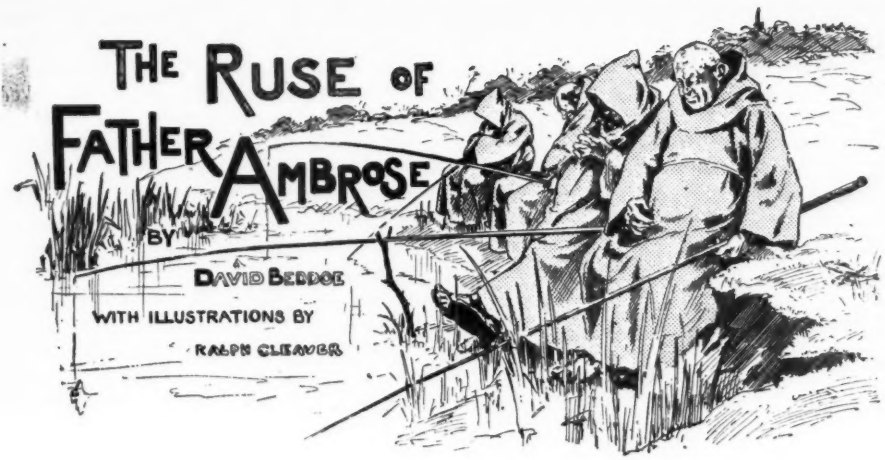
In the sounds of "l" and "r" (as in "rose") the pupil has to be made conscious of another vibration, *i.e.*, the front of the tongue, caused by the passage over it of the vocalized breath. The position of the mouth in the nasal sound of "m" is also pictured, the lips being closed and the vocalized breath passing through the nasal passages. It is usual to develop the nasal sounds last, in order to lessen, as far as possible, any tendency to a nasal tone.

Many of the sounds bear a resemblance to each other in *appearance*, though not in sound, and as it is by the look that the deaf child judges, he is often confused, in the earlier stages of his education more especially. This leads at times to some comical mistakes. For instance, for "p," "b," and "m" the lips are closed, and if the word used is unfamiliar, it is difficult to distinguish which is being used. The same may be said of "t," "d," and "n," the position of the tongue in each being behind the upper teeth.

The teaching is, as may be gathered, an arduous task, requiring great care and infinite patience. No one should attempt the task who has not a genuine love for these little deaf children.



"V," AS IN VIVID. FEELING THE VIBRATION OF THE VOCAL CORDS AND THE BREATH.



FOUR monks sat by the side of a stream, fishing—four jolly, fat monks in cowl and gaberdine.

They were friars belonging to the Cistercian Abbey of Jorveaux, whose brown gables could be seen peeping out from between the distant clump of beech trees.

It was a mellow old English afternoon. The large, billowy masses of white cumulus clouds, lazily rolling across the sky, threw variegated shadows on the broad meadows and lands, all appertaining to the wealthy Abbey of Jorveaux.

It was a sleepy, drowsy time; and warmed by the sun, soothed by the low-voiced murmur of the waters in the rushes, and fanned by the gentle breeze which swept caressingly upon their rubicund countenances, the four pious monks nodded in unison, and their rod tips bobbed with the nibbling roach, without response.

They were troublous times. Bosworth had been fought and won; Richmond was on the English throne; and Bluff King Hal was but a sturdy urchin in short frocks and rolled cap, without a thought yet of robbing pious monks or of disendowing abbeys. Perkin Warbeck was troubling the realm with his impudent claims, and there were murmurs of wars in France. But the pious brethren only nodded over their peaceful pursuit this balmy June day, and nodded and nodded without as much as a thought concerning these things, or that on their efforts depended the morrow's dinner.

The biggest and jolliest looking of these four rubicund saints was Brother Ambrose, he who sat farthest down stream and half-sleepily brushed his hand across his face, where a fly buzzed with tantalizing persistence.

Flip, flip, went the large hand; buzz went the fly. "Perdition on thee!" ejaculated the monk irritably, as he opened his eyes to glance round apprehensively towards his companions, and smiled thankfully when he saw that with shut eyes they dozed, and, sleeping, could not have heard.

Piously crossing himself, he looked round and regarded somewhat ruefully the two small fish which reposed in the rushes by his side.

He coughed, this fat, sound-chested monk, in a mild, deprecating way. There was no response. He coughed again, and the sound was like that of a fog-horn. The three sober figures started, blinked, and glanced furtively at one another.

"Ah, Brother Ambrose," said one, "thou hast, I fear, caught a rheum on the grass; I have been watching thee some time—Sancta Maria forgive me—and methought that thou lookest far from well."

The monk turned his jolly face round and

smiled. "I thank thee, Brother Gregory, for thy attention, an' thou hadst fished better than thou hast watched, we had had more than two small roach to our catch."

They looked around in alarm. Two fish only! And it wanted but an hour to vespers.

"Methinks that there must be thunder about," piped in Brother Gregory. "We know how thunder affects the feeding of the fish; their cunning instinct, as that of the brute creation——"

"Methinks it is not the feeding," interposed Brother Ambrose hurriedly—Brother Gregory loved to discourse learnedly on the instincts of the brute creation—and he pointed significantly at the bare hook which Brother Gregory inadvertently pulled up. "See, thy bait has gone."

"It must have rubbed off on the sandy bottom, as thou knowest, Brother Ambrose, it will ofttimes do. Still, there is no need to tell thee that," he added hastily, "for we all acknowledge that with rod and line there is not thy equal in the abbey."

Brother Ambrose smiled benignantly. It was his weak point. What mattered it that Brother Thomas could sing like a chorister of Rome, or that Brother Anselm could preach a sermon that even Baldwin himself need not have been ashamed of, when he, Brother Ambrose, was a fisher without equal, and knew every trick? What was the best bait, where the most likely spot for the big roach, so that there was not another like unto him from abbot to novice? And Brother Ambrose was proud of his craft, though when he saw the two small roach beside him he grew uneasy.

"It is but a sorry catch," he exclaimed doubtfully. "Methinks, as you say, that there must be thunder in the air." And he looked around as if seeking confirmation from the clear sky; but finding none, he turned ruefully again towards the stream.

"Ay, and what will Brother Ricardo say when we deliver the fish at the refectory, when he has prepared the sauce and the basting therefor?" asked Brother Gregory lugubriously.

Brother Ambrose's beaming face looked perturbed. Brother Ricardo had a biting tongue, as pungent as his own sauces.

"What bait art thou using?" he asked suddenly, turning from a subject which brought up unpleasant recollections and still more unpleasant prospects.

"A brandling, good and fat; scoured, as you have advised me so to do, with moss picked from the old ruin walls, good for any roach."

"Ay, it is good," replied the other approvingly; "but methinks that at times fish look not at the fairest brandling which ever dangled on hook. Then they require to be tickled and coaxed, like Brother Thomas here when he suffers from one of his humors; then a piece of good made paste, with no vile balm in it, but flavored with just a tincture of aniseed, is the bait, even such as I have now in my pouch. I will go higher up, to the big pool by the rushes, and, by Saint Hubert, I shall marvel much if I catch not enough ere vespers to please even Brother Ricardo and silence his tongue.

"I will leave these two for your share, so that thou mayest not go back empty-handed," and, rising to his feet and tightening his girdle, he made his way up stream, carefully examining his rod and line as he went, whilst the others, after seeing him go, baited their hooks, dropped in their lines, and nodded again with easy conscience; for Brother Ambrose had said that he would catch enough, and Brother Ambrose was a good angler and a man of his word.

The monk made his way up along the bank, and turning a bend lost sight of his companions. But he looked not back; he was intent on reaching the big pool where land, by the grace of St. Hubert, he would such fish as would make Brother Ricardo's jeers turn into sounds of wonder.

He reached the big pool at length, having by this time left the three others some few hundred yards down stream.

A wide, deep pool it was, rush-grown on the nearer side, alder-fringed on the farther, where the dipping branches skimmed the almost placid surface; and here, having

with professional eye surveyed it from top to bottom, Brother Ambrose seated himself in a niche in the bank, and having carefully taken out a little of the cunningly wrought paste from his pouch, baited his hook with a subtle skill worthy of his great reputation, and swinging it gently, with a parting benediction, consigned it to the depths just beyond the reedy fringe. Not for nothing had he obtained his reputation. His large red face beamed, his small, twinkling eyes were fixed keenly on the rod tip, as, bending forward, he watched for the slightest movement, like the cunning sportsman that he was.

HE GREETED IT WITH A TRIUMPHANT, "HOW NOW, BROTHER RICARDO, HOW NOW?"

Bob went the tip; a sudden clean movement of the wrist, and a pound roach flopped on the grass beside him.

He beamed as he rebaited his hook, and again he threw the line and waited and watched, gently moving the point of the rod up and down. Another and another he landed; and as each one lay jumping on the bank he greeted it with a triumphant, "How now, Brother Ricardo, how now?"

He was in the midst of this absorbing pursuit, when suddenly he heard the sound of running feet coming rapidly up behind him, and, looking round, saw a youth, breathless with haste, speeding in his direction.

He raised his bland, ruddy countenance in surprise, and his "Ah, Brother Ricardo, how now?" choked in his throat, there was something so urgent in the pale face, the wide, staring eyes.

The lad reached the stream; then, as if frightened at its depth, drew back and looked wildly up and down.

"What ails thee?" asked Brother Ambrose.

At the sound of his voice the lad started, looked round as if seeking flight, then changing his mind came up. "Oh, Father," he cried, "save me! save me!"

The monk looked about him. "Where is the danger? Why runnest thou?"

"Oh, the avengers of blood are on my track; they seek me for my ruin. Save me, Father, save me!" and the lad knelt and plucked at the end of his long gaberdine.

Brother Ambrose's rubicund counte-

HE SAW A YOUTH, BREATHLESS WITH HASTE, SPEEDING IN HIS DIRECTION.

nance looked disturbed. "Fly to the abbey," he cried, "the abbot will perchance protect thee; there is your sanctuary."

The lad glanced round. "No, no, Father, it is too late. See, see, they will be here. There they come." And Brother Ambrose, following the direction, saw the shining head-pieces of men-at-arms riding past a distant gap in the hedge.

"What hast thou done?" he asked doubtfully.

"Oh, nothing, Father, nothing. But these men of blood will not take that for an answer; my life will pay the forfeit an' they take me."

"I am a man of peace," exclaimed the monk dubiously, "and love not to embroil myself with men of war."

"Shall it be said, then," said the youth, "that one cried for help from a monk of Jorveaux and he was afraid?"

The monk hesitated. The lad had struck home; but he muttered, "Who am I to withstand these men of war? What succor can I give thee? An' it had been Brother Ricardo now, or the abbot——"

"Hide me, Father, hide me, I pray you," exclaimed the lad in a sudden access of fear, as he saw the steel caps draw rapidly near.

The monk looked about. There seemed no place to hide the lad. He looked behind on the broad, open meads; he looked at the stream, from the reedy fringe to the farther side where the alder branches dipped; and as he looked, his rubicund face grew deeper in color, and a light twinkled in his deep-set eyes. "No match am I with sword and buckler against men of war," he murmured; "but in wit Brother Ambrose is a match for any head that wears a steel cap." And as he spoke he slipped his cowl from off his tonsured head and, undoing his girdle, went behind a clump of alder trees, where he cried, "Stand there, O youth, whilst I prepare to deceive these Philistines."

The lad stared to where now was to be seen only the close-shaven poll of the monk. A sudden heave, two bare arms in the air, then a rolled-up cowl and gown were thrown towards him. "Put these on, sir youth, take my rod, and fish, and I, even I, Brother Ambrose, will go into the water to save you from the pursuers of blood."

The youth, with ready wit, slipped on the cowl and gaberdine.

"Turn thy back," cried the monk; "it is not seemly that thou shouldst see me thus." The youth turned. A heavy plunge, a loud gasp, and soon a rubicund face, coughing and spluttering at the farther end of the pool, was all that was to be seen of Brother Ambrose as he wallowed about like a great hippopotamus.

There was a clatter of hoofs, and a loud, stern voice called out, "Sir priest, hast thou seen a youth in jacket and long hose, with a rolled cap, go by?"

The figure in cowl and gaberdine shook. "No, sir knight," he replied in a low, strange voice, "I have seen nothing of such an one. There is no one here but myself, who fishes for our morrow's dinner, and Brother Ambrose yonder, who, being sorely afflicted with the humors, taketh a dip according to the order of Brother Origen, who is a learned physician."

"A murrain on you!" exclaimed the knight irritably; "thou hast no eyes for anything but thy fish, that thou couldst not see a lad running under thy nose. He passed not ten minutes ago, I swear; and Brother Ambrose, as thou callest him, he walloweth like an ox in the water, and hath, I know, seen nothing;" and a grim smile played over his countenance as he saw the red, puffing face and tonsured head bobbing up and down at the other side of the pool.

"Peste! Come on, we'll have the quarry yet," and with loud maledictions they rode away.

Brother Ambrose, with many a pious exclamation, saw them depart, and puffing, blowing, and with chattering teeth drew near. "Sir youth," he cried, "throw off, I pray thee, the cowl and gown, for thou art safe, and lay them behind the clump yonder, so that I may once more be clothed in decency."

The youth smiled, and slipping them off, laid them, even as the monk had bidden him, behind the alder clump.

"Turn thy back, O youth, that I may come out; and look not round till I give thee word, or the curse of Lot's wife be on thee. O Sancta Maria! what if Brother Ricardo did but see me now?" And rolling out, the monk slipped on his discarded garments, and forthwith ran puffing and

"A MURRAIN ON YOU!" EXCLAIMED THE KNIGHT IRRITABLY; "THOU HAST NO EYES FOR ANYTHING BUT THY FISH."

panting up and down the bank to restore his retarded circulation.

At length, scant of breath, he drew up before the youth, who, rod in hand, still remained at the water's edge.

"Why tarriest thou now?" he demanded. "The avengers will be back ere long."

"Not they," replied the youth; "they will make for the castle of De Greville, thinking I have made thither."

"Still, it were well that thou shouldst seek the sanctuary of the abbey, and throw thyself on the protection of the saintly abbot, who, if a strict man, is a just one."

"No, methinks I will not," replied the youth calmly.

"Not, wherefore not? Whither wilt thou go, then?"

The youth looked down, and drew figures on the ground with the butt end of the rod. "I have one who waiteth for me in the copse behind the abbey," he murmured.

"What callest thou him?"

"He is one Edward FitzAlan. Knowest thou aught of him?"

"What, the youth who was once squire to Reginald de Braose—who, methinks, was the knight who rode by when I lay puffing in the water—and who dared raise his eyes to Maude de Clare, whom Reginald holds in ward, heiress to the Castle of Jorveaux and lands without measurement?"

"The same."

"What, does he still haunt this district, the rash fool, to put his head in the lion's jaws for the love of a pert jade, let her be ever so beautiful?"

"Pert jade!"

"Yea, she ever was a minx, that Maude de Clare, a wilful lass, who set all the lads fighting over her, and hath led Reginald de Braose a sad dance, stern man as he is. A bare cell and sparse food would, I reckon, be the proper treatment."

"A bare cell and sparse food!" exclaimed the other, with a scornful toss of his head. "Indeed, Father, but thou art very ungallant. However, I must go, for Edward FitzAlan awaits me, and I would not that harm should come to him, since he has put his head in the lion's jaws for me."

"For you?" echoed Father Ambrose, staring.

"Yes, even for me," replied the other, looking down modestly; "for I, O Father, am the minx, the jade."

"What!" echoed Brother Ambrose, aghast.

The other glanced up at the monk's bewildered countenance, and a merry, rippling laugh went out over mead and stream. "Yes, I. I am Maude de Clare."

Over the monk's fat, jolly face a world of consternation came, and his ruddy cheeks grew deeper in tint at his horrified thoughts; but quickly laying his hand on the other's shoulder, he said, with a poor effort at sternness, "Misguided daughter, thou must come with me then."

The girl did not move, she only laughed; and while her glorious eyes sparkled merrily, she exclaimed, "What, shall I then tell the monks, O Father, that you wallowed in the water, as Reginald de Braose said, even as an ox, while I, Maude de Clare, sat the while fishing on the bank in thy cowl and gown? Why, what would Brother Ricardo say, O Father?"

The monk's roseate face grew purple. "Get thee hence, false jade!" he cried in alarm; "get thee hence, and leave a pious monk to his fishing."

The girl laid her hand on the sleeve of his gaberdine. "Father, take it not amiss," she cried in contrition, "that I love Edward FitzAlan better than Stephen de Lacy, whom my guardian wishes me to espouse; think not that I am ungrateful for what thou hast done. Let this be the token." And before the astonished monk could resist, she had kissed him upon the cheek, and with a merry laugh was gone.

From the distant abbey came the sound of the vesper bell, and Brother Ambrose, shaking his head doubtfully, and inwardly much perturbed, picked up his rod and line, and, wrapping up his few fish in some rushes, walked slowly down to rejoin the others.

Brother Ricardo that night made merry over the smallness of the catch, and said hard words of one who with a great reputa-

tion could bring home only a few small roach, all of which Brother Ambrose received, however, with unusual meekness; and the others, too, wondered why the cunning hand of Brother Ambrose had failed to do what his lips had promised.

And when later on the country rang with the news that Maude de Clare, heiress to the Castle of Jorveaux and lands without measurement, had taken flight with Edward FitzAlan from under the very nose of Reginald de Braose, her guardian, it fell out that Brother Ambrose did penance for more weeks than he had ever done before. But they only thought that it was because his conscience pricked him, inasmuch as that which he had promised to do he had not made good, which, however, only raised him the more in their estimation. And they found corroboration for their conclusions in the fact that Brother Ambrose fished not again in the big pool which he had loved. But Brother Ambrose, when questioned, only smiled solemnly, and, like the wise man that he was, kept his own counsel.

THE COUNTRY RANG WITH THE NEWS THAT MAUDE DE CLARE HAD TAKEN FLIGHT WITH EDWARD FITZALAN.

A PEEP INTO ENGLISH COURT LIFE.

By George A. Wade.

Visitors to the state apartments at Windsor Castle cannot have failed, as they passed through the Waterloo Chamber, to notice one or two photos there which give a general idea of how completely that magnificent room is changed when a theatrical performance takes place in it "by command of Her Majesty the Queen." If the visitor is enough interested in the photographs to question the attendant showing him round, he will probably learn not a few interesting facts regarding these performances.

The following account of how a theatrical display is given before the English sovereign at Windsor is, however, the result of special interviews, which were given to the writer by two or three persons who have, at one time or another, had the honor of appearing before the Queen in these performances; and who, from their special facilities for seeing and knowing all that is done on such occasions when they have played at Windsor, are in a unique position for giving an account of a ceremony of which the outside world has little knowledge.

The Waterloo Chamber itself is admirably adapted for all kinds of stage performances. Its noble grandeur in height, length, and breadth; its beautiful decorations and portraits; its surrounding rooms, which readily lend themselves to the purposes of dressing-rooms, supper-rooms, etc., all combine to make it an exceptional apartment for the purpose. The pictures, by the finest artists of the period, show the famous men of the days of Waterloo; conspicuous, of course, is that of the Duke of Wellington over the entrance.

When Her Majesty the Queen wishes any particular company to appear before her and play some drama, opera, or comedy to which she has taken a fancy, or of which she has heard an excellent report, a "command" is sent to the manager of the theatre in question to appear with his company on a specified date. A card of admittance is sent to the manager to cover the number of performers desired or requisite; without that, and beyond it, no person gains admittance; so that friends, etc., of the performers are kept effectually out. This, as will be obvious, is a most necessary precaution, or there is no telling how many folks would be present.

Guests who are specially invited by the Queen to witness the acting receive gen-

erally quite an informal invitation, on an ordinary card—except that it bears the royal arms—much the same as they would to any similar function elsewhere. There are often a dozen royalties present, or even more; and there are, as a rule, about fifty or so invited guests, with sometimes almost the same number of servants in the castle, whom Her Majesty's kind forethought has provided with a splendid evening's entertainment.

The invited guests include very often the Ladies and Gentlemen of the Household in waiting for the time being; some of the officers of the Guards stationed at Windsor; probably the Dean and Vicar of Windsor, with their wives respectively; and sometimes a few of the old military knights stationed in the Castle yard. If any distinguished personages chance to be staying with the Queen, they, of course receive an invitation to the play.

The scenery needed for the performance comes down to Windsor two or three days before the day fixed for the acting of the opera, or whatever it may be. Most of it is specially made and painted for the occasion, as the large wings, scenes, etc., used in the London theatres are comparatively useless for the much more restricted stage area available in the Waterloo Chamber. But the personal effects, as we may call them, of the actors, such as the "make-ups," etc., are brought down with the troupe on the same day as the performance takes place.

The first arrivals are the army of dressers, scene-shifters, and auxiliaries of all kinds, who get to the Castle about four or five o'clock on the great day. The company of actors and others taking more important parts arrive, perhaps, about half-past six. One of the actresses who has done duty more than once on these occasions before

Photo by Russell & Son.

A PHOTOGRAPH OF QUEEN VICTORIA AND THE DUKE AND DUCHESS OF CONNAUGHT WATCHING THE "DEATH SCENE" IN "ROMEO AND JULIET."

Her Majesty told the writer that there is always, when she has been there, a rehearsal in the early part of the evening, at which all the members of the company have to go through their parts, even including the principals. From what I heard from other actors this is an invariable rule.

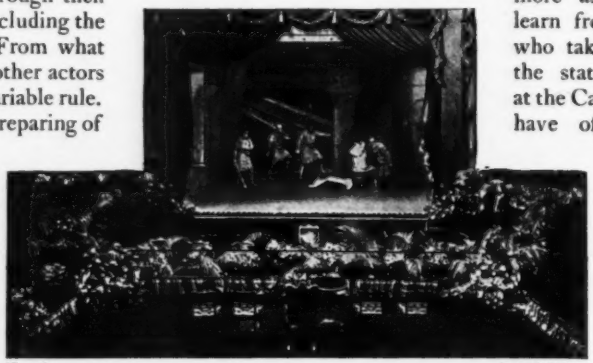


Photo by Russell & Son.

THE "DEATH SCENE" IN TENNYSON'S "BECKET." THE "ROYALTY STALLS," AS WILL BE SEEN, STAND WELL IN THE FRONT.

As to the preparing of the stage, it is done by the people at the Castle, acting under the advice and direction of the manager of the theatre whose company is playing. This official makes several preliminary visits to the Chamber, and tells the Castle authorities exactly what he will require. He indicates how many actors and actresses there will be, how many musicians in the orchestra, how many minor performers of the "extra stage hands," etc. The Castle people, I was told by one of the managers who had been thus honored, provide the workmen required to prepare for all these, and on the appointed day the manager goes down early from London, and generally takes his stage carpenter with him.

The stage is made to stretch right across the room, at the western end of it. It is naturally made as large in area as can possibly be allowed, yet it falls far short of a London stage. Thus it appears all the more astonishing to learn from the guide who takes you round the state apartments at the Castle that there have often been as many as two hundred performers on it at the same time, during the chorus scenes of some of the operas. One can hardly credit it, were one not so reliably informed.

All having been got ready for the evening's performance, the latter begins, as a rule, about a quarter to ten. Sometimes, if the piece to be gone through is rather lengthy, Her Majesty will fix her dinner hour somewhat earlier than usual, but this is rare. The final scene of the play has now to be over, in all cases, by midnight, and often it is finished by 11.30; for the Queen cannot, at her advanced age, sit through longer hours than these without feeling much discomfort. Occasionally the acting may only last just over an hour, if the piece is a short one.

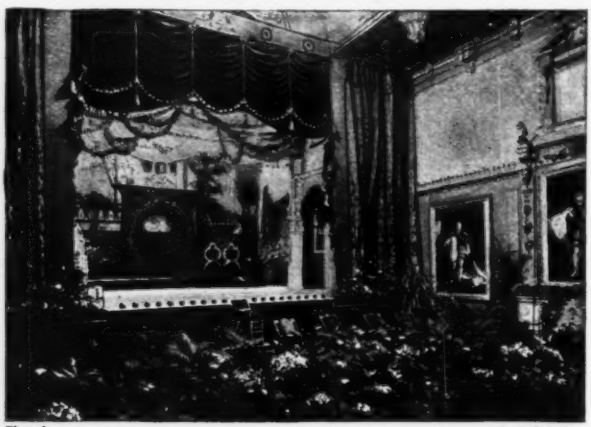


Photo by Russell & Son.

A SCENE FROM THE "GONDOLIERS."

Her Majesty's seat is, of course, placed exactly in the centre of the front row, often a little in advance of the others. There is generally a table placed beside it, and writing materials, so that she can make any notes or remarks that strike her as the play progresses. Before this front row of chairs there is always a regular garden of plants, charmingly arranged. Flowers and ferns make the whole place more like a scene from fairyland than like an ordinary theatre. Electric lights are interspersed among the plants, and these add considerably to the fairy aspect of the scene. The sides of the Chamber, and the way by which the Queen enters, are veritable gardens of flowers and lovely blooms.

The orchestra is simply hidden among masses of ferns and decorative plants. Generally speaking, the orchestra numbers about forty, but this varies according to the nature of the piece to be performed. There is not, as is generally supposed, a local orchestra for the operas at Windsor, but the whole of the musicians are brought down from London with the theatrical company by the manager. When the piece to be played is an opera, the orchestra comes along in full force.

THE FAMOUS WATERLOO CHAMBER IN WINDSOR CASTLE.

All these magnificent flowers and plants which thus adorn the Waterloo Chamber —and the views shown of them in the photographs here reproduced will give a capital idea of how beautifully they are arranged—come from the royal gardens at Frogmore, and are brought on the morning of the day on which the performance is to take place. They are arranged under the supervision of the chief gardener and his assistant.

It may be interesting to know, as I was told by one who sung in the chorus on the occasion, that at a recent performance the intervening space between the Queen's seat and the stage was transformed into a carpet-garden.

A brilliant green baize (so he took it to be), was spread on the floor to represent the grass, and the flower-beds were made by most wonderful art and management to look quite real. The singer in this chorus told the writer that he never in all his life had seen anything prettier, or any imitation thing that looked more absolutely perfect.

The programmes are provided at the expense of the theatrical manager, and arrive at Windsor on the day determined. The front page is printed in gilt letters; the body in ordinary print, but of excellent type. For the use of the Queen one is specially designed. It is larger and better finished, and often adorned in colors. Occasionally the other royalties receive similar copies, but as a rule they get only the ordinary programme, like the other guests. The guests are allowed to keep these programmes after the performance as mementos of the occasion.

Contrary to what is generally believed, I was told by a well-known actress who has been present at one of these interesting nights, that the Queen does frequently applaud the players, and that such applause during the acting itself is not at all unusual. The applause is in every instance by clapping of hands, and one may say that in almost all cases Her Majesty leads off in it. It is not generally considered etiquette to applaud any part till the Queen

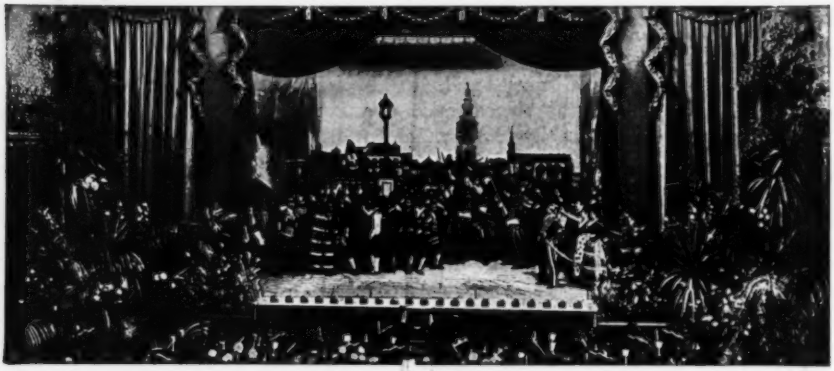


Photo by Russell & Son.

A SCENE "CARMEN."

has done so, and so most of the guests tak their cue from their sovereign in the ma ter. But spontaneous applause sometim s comes when the guests have got especially stirred by some fine scene or part, and it is taken as a great tribute by the players when this happens. Her Majesty on such occasions usually smiles, and acknowledges the justice of the tribute by joining in the applause.

It need scarcely be said that all persons invited to those performances are required to be seated before the Queen enters, and may not retire till she has left the room after the play is over. The curtain rises immediately Her Majesty is seated, so that there is no weary waiting for her; no being there at eleven o'clock one evening to be ready for the opening of the doors on the following night at "Windsor Theatre" as at some of the Broadway ones on great occasions.

When the play is done and the curtain has fallen, the Queen rises and leaves the Chamber, all present standing, of course. She and the royal personages present retire to their own rooms. Sometimes they will require a favorite performer to be brought and introduced to them, but this is rare.

Meantime, in the state apartments neighboring to the Waterloo Room there have been busy hands preparing a bounteous supper for all who have taken any part in the performance just finished. The Audience and Presence Chambers, the Vandyke Room, etc., are brought into requisition for this purpose, and tables are spread in each, according to the different grades of the performers. The Queen is ever bountiful and kind in remembering even the humblest who have served her. Hence there is one room devoted to the refection of the carpenters and scene-shifters and such-like workers, another is given up to the ballet and smaller-part performers, and the third is set out for the "principals."

It may be as well to say here that tea is always ready for the performers on their arrival at the Castle earlier in the evening. But the luncheon or supper, served after all is over, is quite a fine meal, though always cold. It is in every sense what we should call "a first-rate spread." There are several courses, and wines of all kinds. Everybody can practically have just what he or she desires, and right royally do they all enjoy themselves, while the long-restrained laugh and mirth find at last full expression.

Next day the Queen will most probably cause her thanks to be sent to the manager of the theatre whose company entertained her, and also an intimation of how much she enjoyed the performance. She will frequently supplement this by a present of some expensive piece of jewellery, not only to the manager, but to the principal actors and actresses or singers, with her compliments on their fine efforts. To gentlemen thus honored with her presents the Queen

often gives scarf-pins or cigar-cases, or similar articles; while the ladies are favored with gold brooches, bracelets, etc. In every such case the article always bears Her Majesty's monogram, and often a suitable inscription too.

How beautifully the plays can be made at Windsor is shown by the photos published with this article.

The one representing the scene in the second act of the "Gondoliers" shows the stage empty after being arranged, and gives a good idea of how it then looks. In it, too, the arrangement for the orchestra on this occasion is clearly seen. The scene from "Carmen" gives an excellent example of the stage filled with a great crowd of performers, and shows what can be done in this line on such a comparatively small area.

In the "death scene" from "Becket," played by Sir Henry Irving, there is a view of the stage under another aspect, namely, with only two or three actors on it, and the orchestra is almost completely hidden in this photo by the floral decorations. In the fine picture showing the famous "death scene" in "Romeo and Juliet," the manner of adorning the auditorium and the space before the Queen is well shown, and the front row of "stalls."

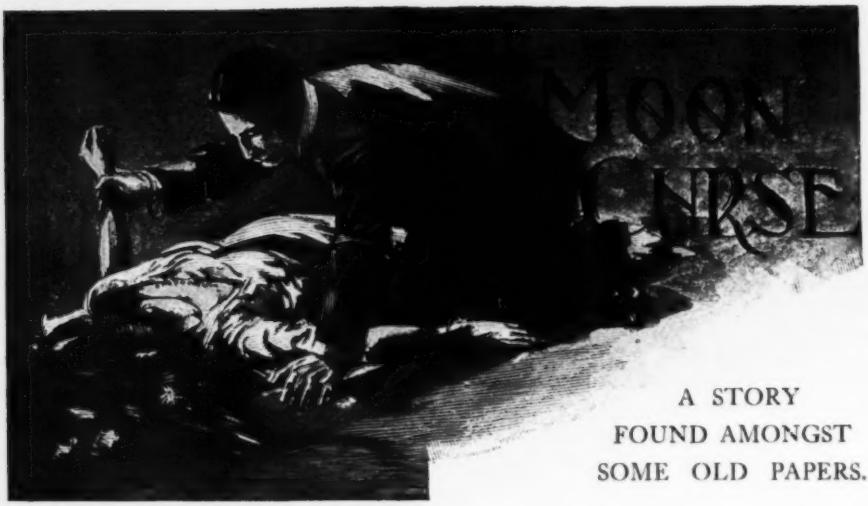
One thing should be mentioned, in conclusion, about all these performances. Every actor or actress, every manager or other person, who was interviewed or questioned by the writer for the purpose of this article, had nothing but unstinted praise for Her Majesty in relation to her treatment and reception of those who had the honor to be "commanded" to perform before her. Some of them had done so privately in the "drawing-room" performances which often take place at Windsor, and they all agreed that it was a positive pleasure to take any part in entertaining the Queen, for a more appreciative auditor or kind hostess it would be quite impossible to find if one sought the world over. More than one of them told me that the happiest recollections in their career were of the evening when they first were "commanded" to perform before Her Majesty the Queen in the Waterloo Chamber at Windsor Castle.

SORROW

Last night came Sorrow while I lay in sleep,
And laid his hand upon my brow, and drew
My mind to wakefulness and thrilled me through
With memories that I thought were buried deep.
I felt a faint and familiar fragrance creep
About my face: and on my lips the dew
Of kisses long time lost fell soft anew:
And in my heart I felt the old love leap.

And so the pain I counted dead came back,
And took possession of my heart and eyes
To make them hold the thing they needs must lack.
Dearer than ever dear—Ah! how unwise
The soul that says: "This grief can no more rack,"
For sorrow slumbers oft, but never dies.

J. J. Bell.



A STORY
FOUND AMONGST
SOME OLD PAPERS.

By Beatrice Heron-Maxwell.

Until I met Estella I had been rather lonely, and this not from necessity, but from choice and chance together.

A barrister's life in chambers is at his own discretion; and can be one of promiscuous gayety, or of self-cultivation and communion. The latter seemed to suit me best and to bring least weariness; without being moody or morbid, I was leading a quiet, equable, and often solitary existence.

The stimulus of small means was wanting to make me push forward in my profession; for my father had left me ample to live on, and my ambition did not carry me beyond content.

Yet there were times when I felt that my life was incomplete; that the future should hold something more for me than increasing isolation. No harvest of wild oats limited my horizon; no memories stifled or hampered my impulses; yet while free to reach my *summum bonum* if I could find it, I did not know where to look; and I passed my thirty-second birthday without even making an effort to lift myself out of my groove.

Then one golden summer day I travelled up to a little coast village for a month's holiday, and found Estella.

Three hours of keen interest and pleasure, the day I met her first; three days of growing eagerness and half-incredulous hope; and then three weeks of gradually deepening happiness, during which I learnt how dearly I loved her, and won her to love me in return.

To others she was no doubt just an attractive, winsome girl; but to some few who knew her well, and to me most of all, she had that undefined charm that is not due to beauty, wit, or tenderness, though all three go to the making of it, but that lies in some deeper, inner attribute of womanhood in its perfection; a charm of soul-sympathy given and demanded that strong manhood must always feel and reciprocate.

I have a little sketch of her, done at that time by an artist-friend, and he has caught and reproduced this subtle, elusive charm, so that the picture is herself. Soft hair, warm in its clinging waves where the sunshine seems imprisoned, shadows an oval forehead; finely marked eyebrows arch upward from soft dark eyes that hold under their screen of close lashes a world of dreamy sweetness, repeated in the tender curve of a little mouth.

The face, pale and clear, shines out like a star from a background of twilight gray cliff and sea.

Under it the artist has painted in her name, "Estella Bouverie, at eighteen. Midsummer Eve."

He gave it to her mother the day that Estella told him of our engagement. I think, perhaps—but there was never any real question of that sort between them. From the moment that Estella's life and mine touched, no division was possible between us.

I knew that I had found my Holy Grail.

We were married there, in the little quaint old church on the hill, and the night before our wedding Mrs. Bouverie said to me, "I should like just a few quiet words with you, Harry. Essie must lend you to me for half an hour."

Estella laughed, and laid her arm caressingly round her mother's neck.

"One would think you were going to improve the occasion, mother, and give him a lecture. Don't be alarmed, Harry. Mother will let you off easily, I daresay."

She stepped out into the garden, and I drew my chair closer to Mrs. Bouverie's sofa, for she was almost an invalid, and seldom stirred from it.

She laid her hand on mine, and held up with the other a letter, addressed to myself in her own handwriting:

H. Castlement, Esq.,
Not to be opened until September 1st.

The first anniversary of our wedding day!

"I have been debating about this for a week," she said, "wondering if I should give it to you now, or put it off till later, or let things take their chance—and at last I have settled to give it to you to-night, and ask you to keep it until you and Essie have been married for a year, and then to open it—but not before, unless there seems to you some grave reason for doing so. When you read it you may be able to smile at what has proved to be a vain, superstitious fancy on my part. Or, on the other hand, you may find the explanation of something that has grieved and puzzled you. I cannot tell. I can only hope I am acting for the best."

I begged her not to distress herself, for I saw that she was very near to tears, and, strong in my love for Estella, I did not fear any possibility that our life together might bring.

"If her father were still alive," continued Mrs. Bouverie, "his sound sense and judgment would have decided the question for me. Colonel Bouverie knew all that is written in that letter, but we never spoke of it, and he had led me to ignore it, even if I could not forget it. But since his death two years ago, I have had to think seriously of Essie's future; for she has no near relations on either side to whom I should care to intrust her at my death."

"That is, I hope, a long way off," I said, taking the letter. "Dear Mrs. Bouverie, please feel assured that you have done everything for the best. I will keep this letter as a sacred trust from you; and if before the appointed day you wish to recall it, or to extend the time of restriction, you have only to say so."

"The one thing that troubles me," she answered, "is the doubt whether I ought to withhold it from you for so long; whether I ought not to ask you to read it to-night, before it is too late."

"Then put that doubt aside," I replied. "Nothing that the letter could possibly contain would prevent me from marrying Estella to-morrow. My whole happiness—my life itself—is bound up in her. I am so sure of myself that I will burn the letter now, if you will let me, and ask you never to reveal its contents to me."

"No, no, Harry," she exclaimed, "you must not do that. It is written down at last, and it shall stay there, until you read it, for better or for worse; I will no longer doubt about it. You have settled all the vexed questions in my mind, and the matter is ended. Go to Essie, dear, and tell her your lecture is over. Of course I need not ask you never to repeat a word of this to her."

And when I had given my promise, and

put the letter safely away under lock and key, I dismissed it from my mind altogether.

What did anything in the world, past, present, or future, matter to me when tomorrow was to give me Estella?

It was an idyllic wedding, as different as it could possibly be from the huge society side-shows that are like competitive exams; the highest places in the list being awarded to those candidates who can count most notabilities present, and most presents from notabilities.

Estella walked down her own garden pathway on a carpet of flowers strewn for her by loving hands, and across to the little church opposite, where the friends who came for friendship's sake were assembled.

Randolph, one of my legal friends, the man I know and like best in the world, came all the way from the city to "see me through," as he put it, and acknowledged the justification of my happiness when he saw Estella, by the sentiments he infused into the exclamation, "By Jove!"

There is an hour in every woman's life, they say, when plainness is transfigured to beauty, and beauty excels itself. Such an hour came to Estella then. She looked ethereal in her loveliness, the starlike face, the deep soft eyes, the tremulous sweet lips, veiled by a cloud of filmy white; and as I stood at her side I thrilled at the thought that my loneliness was ended, and that the one woman on earth who had power to change my life was going to share it with me.

I pledged myself with mental vows to make her as happy as she made me.

It is like a dream now—the remembrance of that day; and the weeks that followed it, and that grew into months, seem, too, as though they belonged to some other life, unreal, intangible.

Only one fact stands out, in definite glowing color, the fact that my love for her, which I believed complete on the day that I married her, grew as the time went on to an idolatry that was almost pain in its intensity and exaction.

I found myself at times facing the thought for a moment that something might change her to me, or part her from me, and turning coward at it, with the knowledge of what it would mean.

Some such thought as this was in my mind one evening when Randolph had been dining with us, and after dinner Estella had sung and played and talked with more than even her usual vivacity and charm.

"What a lucky chap you are!" said Randolph, with meditative regret, as she closed the door after she had left us. "Why can't all one's friends marry and

THERE IS AN HOUR IN EVERY WOMAN'S LIFE WHEN PLAINNESS IS TRANSFIGURED INTO BEAUTY.

live happy ever afterward like the good people in fairy tales? Why can't one do it one's self? Here you, bachelor and hermit as you were, wander away to a little sea-shore village, and find a 'pearl among women,' while the rest of us blindly hunt for one in a crowd. I used to disbelieve in the possibility of a really happy home; yet here is my ideal fulfilled."

He looked round the smoking-room with its lining of books, its comfortable chairs, its many details of ease and ornament, and his eyes rested on a lace handkerchief that Estella had dropped, and that lay at his feet.

"That is the secret of the whole thing," he said, picking it up. "Other people have a snug little house in town, a smoking-room that is a haven of rest, plenty of friends, plenty of amusement—but other people have either a void or a surplus in their lives—while you have a mainspring of happiness, and this represents it." He held up the little handkerchief and threw it across to me in affected impatience. "You lucky chap!" he said again.

The putting of my good luck into words seemed to reassure me, and when later he went way and I closed the front door after him, I murmured, "You lucky chap!" to myself as though it were a refrain that must inevitably conclude each verse.

Then I went upstairs to bed.

It was a bright moonlight night, and I had a momentary sensation of weirdness as I passed along the passage, and noticed how sharp the lights and shadows were in the white radiance.

The sound of some one laughing and singing struck with sudden incongruity into this luminous stillness, and I paused at the door of our room in a hesitation of startled and vexed amazement.

Estella was generally asleep when I came up after a chat in the smoking-room; besides, the voice and laugh were unlike hers. Then I opened the door.

The lamps were out, but the room was bright as day with the flood of silver light that streamed in at the window, from which the curtain had been drawn back.

Standing in the very centre of it, looking at her own reflection in a long cheval glass, was Estella—my wife.

Her arms were raised above her head, the wide sleeves of the white dressing-gown she wore falling away from her shoulders, and leaving them bare; her hair was down, and fell in a wavy mass to her waist.

She had twisted flowers and jewels in it, and wound them round her neck and arms, and even round her bare ankles, in the most fantastic fashion; and in her hands she was holding a bunch of crimson flowers, the loosened petals of which fell on her upturned face, and showered down on her white dress like drops of blood.

With a slow, rhythmic movement she was swaying to and fro, and while she swayed she sang and laughed to herself.

As I stood spellbound, a lightning shaft of unnamed dread piercing my very soul, she saw me in the looking-glass, and remained transfixed and silent.

Her lips were set in the strange smile they wore when I entered; her eyes growing to the reflected vision of mine, which met them in the mirror—God! there was no mistaking the look on her face, the glittering brilliance of her eyes. She was mad! Breathless, a grip of horror clutching at my heart and throat, I advanced slowly toward her, still holding her mirrored eyes with mine.

Slowly she backed away from me, till she reached the corner of the wall, and there she crouched, as a wild, trapped thing may crouch when it is at bay, and there is no outlet for it. Nearer and nearer, with the horrible pain tightening at every step, I came to her, and then—I saw her eyes flame red and darken, and I knew she was going to spring.

With a hoarse cry of her name I seized her, and fought with her, holding her down by force and a strength of desperation that was almost as maniacal as hers, and at last I got the better of her, and she lay helpless and panting locked in my arms. She—my love—my idol—my wife lay there, spent, suffering, distraught—done almost to death with the violence of our struggle. As I knelt there clasping her closely, not daring to release her poor little fluttering

wrists, the whole world seemed to recede in a black mist, and to leave us two alone —the girl who had been changed in a few brief moments from the fairest thing on God's earth to a frenzied madwoman, and the man who loved her, who was her husband, who had given his very soul into her hands. It was dark in the corner of the room where our struggle had taken place, and I was between her and the window, so that no ray of light could reach her. I could not see her face, but I felt after a few moments that her eyes were no longer on mine, and gradually the tension of her hands and of her whole frame relaxed.

She lay inert and passive, and as I waited, afraid still to move, I heard her breathing grow quieter and more regular, until at last I knew by its sound she was asleep.

With a prayer of thankfulness at this merciful respite, however short it might be, I lifted her gently, and, carrying her to the bed, laid her down.

Then hurrying to the window, I drew the curtain—for the moonlight seemed to me ghastly and unbearable — and lit a small lamp, which I shaded from her eyes. And then I sat beside her and kept watch for the rest of that awful night. A lonely vigil! If ever in the old days I had fancied myself solitary, I would gladly have gone back to them from the agony of loneliness that possessed me now.

My mind refused to believe in this calamity that had given to me something worse than bereavement, and I found myself murmuring as I looked at the white face on the pillow, with its old gentleness of expression stealing over the features, "You lucky chap!"

It was early in the morning, when sunrise shone through the curtains and the wakening birds sang a hymn of dawn, that she stirred and opened her eyes.

When she saw me she smiled—a divine smile of love and trustfulness.

"Why, Harry," she said softly, stretching out her hand to me, "what are you getting up so early for? You look as if you had never been to bed all night—so tired. You silly boy!"

I had nerved myself for a terrible scene with her; I had been summoning all my courage to face this awful doom for her and myself, and the second shock was too great for me—I fell on my knees beside her, and buried my face, and burst into tears.

HE KEPT WATCH FOR THE REST OF THAT AWFUL NIGHT.

With sweetest, pitying tenderness she put her arms round my neck and soothed me, while I brokenly explained that I had had a horrible dream about her which I could not shake off, and which had unnerved me.

"It is strange," she said, when she had persuaded me to lie down and rest, "but I fancy I must have had a bad dream too,

Harry. I am so tired out, and, see, my wrists are bruised and painful."

I should perhaps have found it more difficult to hide from her the real cause of my distress but for an event that took her thoughts away entirely.

This was the sudden death of her mother, of which we heard by telegram early that same morning. Mrs. Bouverie had suffered from a weak heart, and had passed away peacefully in her sleep the night before.

In her sorrow Estella forgot everything else, and I, finding no trace in her of the strange possession of that night, put the thought aside until after our return from the country.

Then I remembered the letter that Mrs. Bouverie had given to me, and her permission to open it in any perplexity.

I felt sure that it must hold some explanation of this awful occurrence, and I decided to read it at once.

"Years ago," it began, "when I was in India, where my husband was in business, and Estella was a baby of two, a strange thing happened to me. My ayah, of whom I was very fond, died suddenly, and to replace her came a Pathan woman, whom from the first moment I instinctively disliked. But I could find no other in the place. She was a dark, handsome creature with stormy eyes.

"The baby did not thrive under her care, yet I was afraid to say much to her about it; though my husband laughed my fears to scorn. 'Find out somehow or other,' he said, 'whether it is her fault that Estella is not well, and, if it is, give her the sack at once.' I decided therefore to watch her carefully. For two nights nothing happened; on the third I saw ayah steal out of the nursery, down the veranda steps, and away.

"I ran to my baby's cot, and found her sleeping so heavily that I could not rouse her. She had been drugged; and I then felt no doubt that ayah had constantly done this in order to go out when she wished unsuspected. I called my husband, and together we waited until about three hours later ayah returned. Then he spoke to her for me; a few short, sharp words of dismissal, with the proviso that if our little girl should be seriously ill—for she was still unconscious—we should require ayah to answer for it.

"She made no reply to him, but turned and looked at me steadily for a moment. There was concentrated malignity in her gaze.

"Then, with a singular rapid sign of her fingers over the baby, whom I was holding in my arms, she began to speak in a rapid monotone, and though my husband strove to stop her, it was useless. I gathered, from the few words of her language that I knew, that she was uttering a curse, and afterward at my earnest pleading my husband told me what she had said.

"I can see her now, standing in the bright moonlight that fell from the veranda window right on to me and Estella—her dark hands lifted menacingly above her head, her attitude that of a cobra when it is about to strike.

"'Wait,' she said, 'till the child you hold in your arms is grown to womanhood; then shall the curse fall upon her. She shall be cursed by the moon, she, and one girl-child of every generation that follows her. Whenever the moon looks on her as it is looking now, she shall be given over to the spirits of darkness and evil.'

"Then she turned and went out into the night, and we never saw her again. Estella was very ill for some days, for the constant drugging had undermined her health, but we pulled her through.

"My husband treated the Pathan woman's threat lightly, but it has dwelt in my mind ever since. To those who have lived much in India and have learnt something of its wild and mysterious people, with their inexplicable powers, this will not seem absurd. I can only pray and trust that her curse will never be verified."

That was all.

For many weary months I carried in my heart this secret, with the dread that its sequel, about which no disbelief was possible, would recur.

Often during the long nights when the

moon was at its full I kept guard sleeplessly over Estella, fearful lest she should discover that I did so, feeling at times as though the curse had come upon me also, and would some day hold me under its spell. And then one night, sick at heart, tired out with watching, I slept, and while I was asleep she must have awakened, and, drawn by some weird influence, have gone to the window and pulled back the curtains, letting the light fall uninterruptedly upon her.

Some intuitive sense of danger made me restless in my sleep, and suddenly I awoke to find her bending over me, that fearful look upon her face again, and in her upraised hand—a knife.

I cannot describe this second struggle between us; my soul faints at the thought of it. When it was over, and I had once more gained the mastery, and when, as before, she fell asleep exhausted, I could only pray that a merciful Providence would take her from me in her sleep, as her mother had been taken—before some awful tragedy divided us, and revealed to her the knowledge of this deadly blight that had come into our lives. From time to time as the year went on, in spite of all my care, the same thing happened; it seemed as though some stronger power than my will, and my devotion to her, mocked at my efforts to save her from the spell. The strain of always watching for it, of feeling that so slight a barrier stood between the sanity and insanity of the wife who was all in all to me, told upon me physically and mentally.

I CANNOT DESCRIBE THIS SECOND STRUGGLE BETWEEN US.

She began to notice it, and wonder at it herself; and I read more than once in her eyes a dawning fear of me; a transient suspicion that there was something I concealed from her, some touch of remorse, of alarm—of—perhaps, latent madness. I found myself laughing, actually laughing once, at the thought that this last idea should come to her about me; the irony of it struck me with such force.

Her terror at my causeless mirth recalled me to my senses, which were certainly unhinged at the moment, and restored their balance—I vowed to myself I would never laugh again.

"I tell you what it is," said Randolph seriously to me one evening at this time, "there is something radically wrong with you, Castlement, and if you will take my advice you will give up work, shut up your house, and travel for at least a year. I don't want to force your confidence, but I have been watching you for some weeks, and I think Mrs. Castlement feels uneasy about you too. You want a change, and fortunately you are one of those who can have what they want."

"A lucky chap!" I quoted bitterly.

He stared at me in troubled surprise, and I felt that the same suspicion had entered his mind also.

I decided to take his advice, and see if the strain proved lighter with other surroundings than it did at home.

"Why not go to India?" Estella said. "I was born there, you know, Harry, and it would interest me doubly to see the places that mother used to live in. Take me there."

Thank God, I granted her wish.

It was on our arrival at Bombay, at Watson's Hotel, where we went direct on landing, that the crisis came.

The voyage had passed safely as far as Estella was concerned. There had been no recurrence of what I dreaded for her.

But for me, I felt as if the beginning of the end had come; life had become unendurable to me, yet I longed to live for her sake, to shield her from the interference of others, who, were her secret known, might place her under restraint.

The thought of my darling among strangers, treated as a dangerous lunatic, was maddening to me; it haunted me night and day.

The cloud between Estella and myself had deepened; my depression affected her, and I could see that she was growing afraid of me.

It was our first night at Watson's, and, believing that Estella was safe, since the night was dark and moonless, I had allowed myself to fall asleep, with no special thought of her in my mind.

About two in the morning I awoke—to find her gone.

A ray of moonlight striking in between the shutters fell on the pillow where her head had rested, and showed me that my sense of security had played me false.

Dressing with frenzied haste, I ran out into the passage, and ascended to the next floor in search of her.

The light shining through a door that stood slightly ajar drew me toward it, and the glimpse of a white figure standing just inside impelled me to push it open and enter.

Estella was standing motionless and upright, looking like a spirit in her long white robes. Sitting upon a rug on the floor facing her was a dark woman in native dress, old and ugly, the paleness of a great terror shining in her eyes, and showing under the olive brownness of her skin.

Her hands were stretched out as though to ward off Estella's approach. She was muttering and crying incoherently. Even as I stood there, some one brushed past me —an Englishman, and went toward the woman, asking her what had happened and why she was calling out.

She answered him in her native tongue; then, still gazing at Estella, lifted her arms above her head, and chanted something in a curious sing-song tone.

The man looked at me with a smile.

"I suppose," he said, "that she has been making a noise in her sleep, and disturbed you so that you came to see what is the matter. She is my wife's ayah, and has a habit of somnambulism. Do not be alarmed. I am sorry this lady—your wife?—has been frightened."

I had been holding Estella's hand, and watching her face, which had changed its expression of furious cunning for one of divine compassion and sweetness. She put her hand to her forehead now with a sigh and said, "I must have been walking in my sleep, too, and I suppose her voice attracted me in here. But why is she alarmed (for the woman still crouched and sobbed in terror), what does she say?"

"She says," said the man, "that you are a ghost come to kill her. She declares that she laid you under a curse years ago, and that she removes it now and begs you to forgive her. It is a dream, no doubt, but if you would assure her of your forgiveness she would be quieted, and then I will bring my wife to look after her."

Quietly Estella went toward her and said:

"Do not be alarmed. I have quite forgiven you, and I shall never come to frighten you again. See, the curse is gone, and we are friends."

She laid her own white hand on the woman's brown one for a moment, and

the latter caught it between hers and held it to her lips.

"Thanks," said the man; "now she will be all right, I am sure. I am so sorry you should have been disturbed."

I drew Estella away, and led her gently down-stairs to our room, which was now bathed in a flood of moonlight.

"How strange it was, Harry!" she said, clinging to me. "I had no idea before that I walked in my sleep. Did you guess it?"

She was trembling and looking into my face with troubled, questioning eyes. "Ah, yes, I can see that you did. Oh, Harry, is that what has worried you and made you ill? Is that why you murmur my name so often in your sleep? Is that the shadow that has come between us? Oh, tell me, husband darling. If that is all, I can bear that; and perhaps I shall never walk again, now that I have had this horrid awakening. I suppose that woman thought I was a ghost, poor thing, and remembered some one whom she had wronged in the past. If so, I am glad to have set it right. Oh, Harry, did you keep it from me because you thought it would be bad for me to know? I feel as if we were going to be like we were at first, one in heart and mind, you and I. I feel as if a weight were lifted off me. Speak to me, Harry! Tell me our happiness has come back to us."

SHE LAID HER OWN WHITE HAND ON THE WOMAN'S BROWN ONE, AND THE LATTER HELD IT TO HER LIPS.

And at last I could hold her in my arms again, and tell her with no after-thought of fear or grief between us that our lost happiness had come back, and that she and I were as one again for always. There is no one in the world, except myself, who knows the truth of this strange story, for even the Pathan only dimly guesses that fate gave her a chance of redemption, and attributes the episode of that evening to the powers supernatural that she invoked to her aid, and that in their caprice turned upon her and sent their victim to avenge herself.

And into this question of the invisible world I dare not enter even in my thoughts. I can only vouch for the truth of these bare facts, and accept with untold thankfulness the blessed certainty that the blight on Estella's life has gone for ever.

Sometimes when I look back upon the past I question the propriety of the course which Estella's mother followed. Did she know the truth? It is almost impossible to suppose otherwise. In that case, not even a mother's anxiety for her child's welfare could excuse the deception she practised. Yet what gladness it has brought me! Estella is mine now—strong, beautiful, and happy. The terrible shadow that hung over our past has only made the present brighter and sweeter. Marriage, and marriage alone, could have saved Estella. Without that she would never have gone to India—oh! happy chance that led us there—would never have had removed the fearful curse of madness. In such odd manner does good come out of folly.

From a Photo.

BRIDGE DE CLICHY, ASNIERES.

A result of the bombardment. The holes made by the shells are plainly visible.

THE MOST TRAGIC WINTER OF MODERN TIMES.

By James Morley.

On September 1, 1870, at the battle of Sedan, eighty thousand Frenchmen surrendered to the Germans. Among them was Napoleon III. himself.

The German victory marked the downfall of the Second Empire. On September 4th the Third Republic was proclaimed, with Gambetta at its head and Trochu as its military chief. Many of the German leaders would have ended the war at this juncture, but the desire to complete France's humiliation was too strong. The German army continued its advance toward the capital, and on September 19th the siege of Paris commenced.

Through the dying year, and beyond into the new, the siege continued, until, within the great ring of the Prussian outposts, there hovered about the city the gaunt shadow of starvation.

Butchers' meat grew scarce, then scarcer, then failed. Horse flesh became a not uncommon food, then a necessity, then a luxury, then even an impossibility.

From a Photo.

BATTERY IN CONSTRUCTION, ASNIERES.

The garrison of Paris was ceaselessly engaged in strengthening the fortifications by putting up earthworks.

Curiously enough, almost throughout the siege restaurants were able to serve meals with all manner of choice deli-

cacies. It was not well, perhaps, to be too inquisitive. It did not tend to promote an appetite to persist too closely in inquiries as to the basis of any delicate *entrée* that was served up. It was food, it was palatable, and more than this the hungry individual had no right to expect. Bread was the difficulty, and the restaurant keepers were obliged to put up notices asking their customers to bring their own bread, as they themselves were unable to supply it.

From a Photo.

A COLLAPSE IN THE RUE ROYALE.

The damage done by Prussian shells was intensified by the buildings catching fire.

By January eatables were at famine prices. A hare, we learn, cost $10; a lark (in all probability the dainty bird was a sparrow in disguise) fetched 75 cents; an apple stood at the same high figure, while a fresh egg fetched 50 cents. Bread and butter became an almost impossible luxury, for, apart from the scarcity of bread, butter cost $5 a pound.

One restaurant keeper invested a considerable amount of capital in purchasing an elephant. The trunk was the titbit; and when we learn that small slices about the size of a man's hand fetched $3 each, we should imagine that the speculator reaped a substantial gain. As a matter of fact, however, we learn that he lost considerably over the transaction.

It is not often that one is called upon to decide the edible merits of cats and dogs, but during the siege those who were able to afford such luxuries were able to form very decided opinions upon the subject. The hind leg of a dog properly cooked and served with red currant jelly proved to be almost indistinguishable from hare. Apart from this, the flesh of a cat was held by connoisseurs to be distinctly whiter, more tender, and more succulent than that of a fine dog.

From a Photo.

A BLOCK OF SHOPS IN THE AVENUE DU REUTE, NEUILLY.

The effect of the bombardment was to leave very little more than the outer walls, fire and falling masonry having destroyed the whole of the interior.

From a Photo.

RAILWAY STATION, AUTEUIL.

The destruction of the railway station appears to have been somewhat unnecessary, for the railways were, of course, in the hands of the Prussians.

While the richer folk could indulge themselves in food, among the poor there prevailed the most terrible misery. Outside the bakers' and the butchers' shops there ranged long strings of women, waiting and waiting, hour by hour, throughout the wintry day, in the hope of obtaining small scraps of food. In those long waits many fell through sheer exhaustion, in some cases dying or even dead.

The city was, of course, to all intents and purposes, isolated from the rest of the world. The sole means of exit was by balloon, and it was in this manner that Gambetta managed to reach the outlying provinces and eventually established himself at Bordeaux. News was brought into the beleaguered city by the use of carrier pigeons.

One method by which people were enabled to communicate with individuals inside the French capital was by means of minute photographs of the front pages of the *Times*, containing as much as five columns of French advertisements. Copies were sent to Gambetta, who transmitted them by pigeon from Bordeaux. When received in Paris, the pigeon's letter was magnified by the aid of a magic lantern to an enormous size, and thrown upon a screen. A staff of clerks was engaged whose business it was immediately to transcribe the messages and send them off to the parties indicated.

From a Photo.

A CORNER OF THE RUE DU BAC

A house had been totally destroyed by shot and shell. A pathway was cleared through the fallen brickwork.

The residents of the French suburbs had unconsciously, by fleeing into Paris and leaving their homes and belongings intact and full of food, rendered the Germans an immense benefit. The officers took possession, and, as there was no one to dispute their right, made free of the quantities of wine and provender they found, in the use of which they would have been decidedly restricted had the owners remained at their homes.

Now and again the monotony of the besieging oper-

From a Photo.

PLACE DE LA BASTILLE.

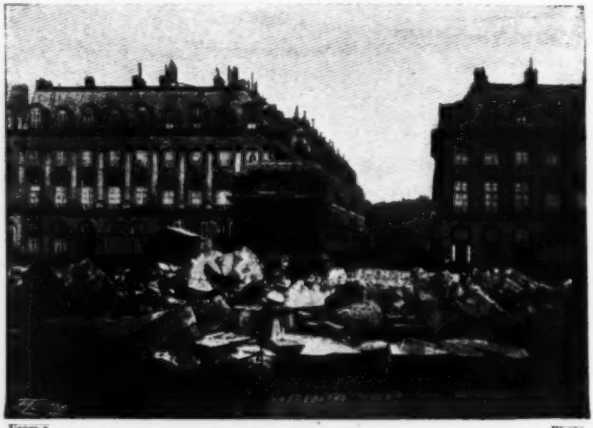
The effect of the bombardment is distinctly curious in this case, for while the houses standing at the extreme corner were destroyed, those on either side were scarcely injured.

left his men, and passing within the lines of the French, made for a house. Creeping round to the drawing-room, he found a gentleman before a fire, reading a newspaper. The astonishment of the individual must have been great when, on hearing a noise, and turning, he found himself face to face with a Prussian officer, who, revolver in hand, ordered silence, and then demanded the newspaper which had fallen to the floor. Having obtained this, the young Prussian quietly withdrew, and the probabilities are that he lost nothing by the rapidity with which he gratified the Prince's desire.

ations was broken by acts of peculiar daring. One German officer, able to speak French like a native, disguised himself as a French peasant, and, appearing to elude the German outposts, made for the French lines. The German sentries, under strict instructions, aimed at the fugitive, but carefully missed him. He was received with acclamation, spread a large amount of false news, and eventually returned to his own camp with a thorough knowledge of the state of Paris.

On another occasion some officers were talking with the Crown Prince, when he turned to one of them who had been describing with great minuteness some of the dwellings within the French lines, and remarked that all he would like now would be one of the latest Paris papers. The young officer said nothing, but the following morning, when visiting some outposts, he quietly

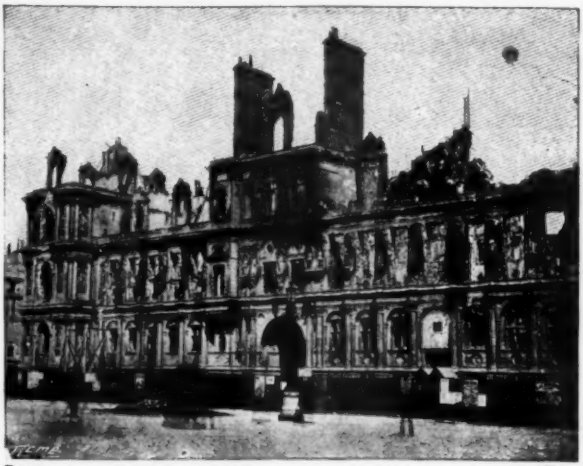
Another instance of the coolness, almost amounting to contempt, that characterized the attitude of the Germans toward the French is to be found in an engagement between a troop of Silesian Hussars and a French battery. The Germans made for the Frenchmen as they were limbering



From a Photo.

THE REMNANTS OF THE VENDÔME COLUMN.

This was one of the most wanton acts that disgraced the Commune. The decision to pull down the column was not an impulse of the mob, but a deliberately decided act on the part of the leaders.



From a Photo.

HÔTEL DE VILLE.

No greater vandalism than the burning of this building could be imagined. Women played no small part in scattering petroleum and spreading fire throughout the unfortunate city.

up, and before the drivers could mount, the cavalry had charged and almost without a blow had taken the entire battery prisoners. They ordered every officer and man to take his proper place, and then quietly escorted the battery off the ground into the German lines, as if they were on parade with their own battery.

Terrible as had been the sufferings in the wretched city by reason of the siege, it was increased tenfold on the commencement of the bombardment.

The first shell is said to have fallen in the Rue Lalande, and bursting in the street, it scattered the fragments of a window over the cradle of a little child sleeping in a room. Three others followed quickly almost on the same spot, and were received with cries from the people of "*Vive la France!*" "*Vive Paris!*"

As showing the misfortunes of some buildings in the Rue Daguerre, four shells fell at intervals on the unlucky house. Strange to relate, not a single person was hurt, but one shell burst in a room where a little child was sitting in bed nursing a dog. The dog was killed, but the child was not even scratched. Frequently the great iron balls fell into the Seine, or, in some instances, striking on the ice, ricochetted, to the immense delight of crowds of children who stood on the bank clapping their hands.

The Rue d'Enfer received a liberal baptism of fire. On one occasion a number of men were drinking at a counter of a wine shop, when a shell burst on the pavement of the street, and the fragments, striking one of the drinkers, killed him.

In the Quartier Latin a shell struck a wine shop, penetrating the walls and pass-

From a Photo.

MINISTRY DES FINANCES.

In the pockets of several dead Communists were found letters from the leaders of the rebellion ordering the destruction of public buildings by fire.

ing clean through the dwelling. The proprietor, with an eye to an advertisement, promptly engaged a painter, who painted under the big hole made by the shell the words, "*Au rendezvous des obus.*"

With a view to minimizing the damage that the shells might do, notices were placarded about the streets by the authorities, warning people to remember and be careful of three things—viz., in the first place to remove all combustibles from the upper storys to the cellars; in the second place, to avoid congregating in the streets in groups; and, lastly, to leave the front door ajar in order that any passerby might, in the event of a shell falling, dart within and seek shelter.

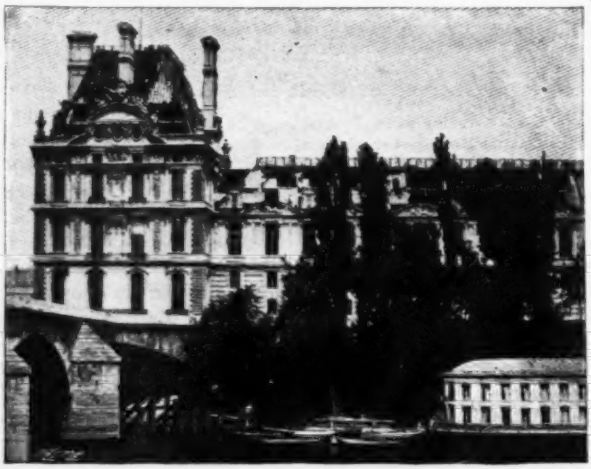
The accusation has been levelled at the Germans that in bombarding Paris they made no effort to avoid hitting the hospitals, and places not merely of national, but world-wide value. Whether true or not, the hospitals were certainly frequent victims.

One shell impinged on the gilt of the Invalides. Fortunately, however, it caused no great damage. A bomb, ricochetting along La Place du Panthéon, hopped through the window of the School of Law, and lodged on the window-sill of Professor Ortolan's room.

In the zoo, curiously enough, not one single animal was killed; but a collection of orchids valued at over six hundred thousand francs was destroyed, the glass houses being shattered and totally wrecked.

In the studio of Nanteuil, one hundred thousand dollars' worth of pictures was reduced to tatters, while in the dispensary of Coursenant, the oculist, a bomb entered, and shattered every vial in the room. Marvellous to relate, although a number of people were present waiting, not one was hurt.

The theatre of the Odéon was hit by two huge projectiles, and the nurses had to take the wounded patients on their backs and carry them down to the cellars.



From a Photo.

THE TUILERIES.

Here again the nation suffered at the hands of ignorant vandals, although the desire to destroy anything savoring of the then existing dynasty is understandable.

As illustrating the pathetic and useless aspect of a bombardment, there might be mentioned that a shell falling in the Rue Lacourde burst and killed six poor women, who were waiting for their scanty rations.

The bombardment ceased on January 28th, and an armistice was announced. On March 1st thirty thousand Germans entered Paris. Within a few days they withdrew, yet the misery of Paris was not yet complete, for on March 18th the Commune of Paris declared itself in opposition to the Republic of M. Thiers.

MacMahon was instructed to take possession of the city, and once more the horrors of a siege were undergone. This time the conditions were somewhat different—more bloody and more terrible. The men who held power were impelled, perhaps, by certain patriotic feelings and some good

motives, but all sense of right and justice were lost. Men, women, and children were shot down in cold blood. In the Rue Haxo fifty-two hostages were callously butchered.

Finally, as a climax, the wretched Communists seemed suddenly to be possessed of a desire to destroy not only her citizens, but Paris herself.

The great column of La Place Vendôme was dragged to the ground. The Tuileries were set on fire, and through its length and breadth the rabble tramped, plundering and destroying. The Ministry of Finance was fired, and became a smouldering ruin. The Hôtel de Ville, the Louvre, and the Palais Royal became preys of the incendiary. Women went about pouring petroleum on private dwellings and kindling them to flames.

On May 28th MacMahon accomplished his task, and then justice or vengeance was wrought on all who were proved to have taken any part in the uprising. It is calculated that during the last portion of the Commune and the eight days succeeding it, thirty-five thousand men, women, and children were shot. In addition, thousands of wretched creatures were consigned to the jails and prisons of France or transported.

The Court set up a species of court martial, with, however, even more summary methods of procedure. The unfortunate prisoners—and mere suspicion was almost sufficient for conviction—were hurried before the tribunal and found guilty.

It is of interest to add that the photographs used in this article were taken by a foreign photographer unfortunate enough to be shut in Paris during the two sieges.

MIDNIGHT ON THE YUKON RIVER.

Copyright, 1898.

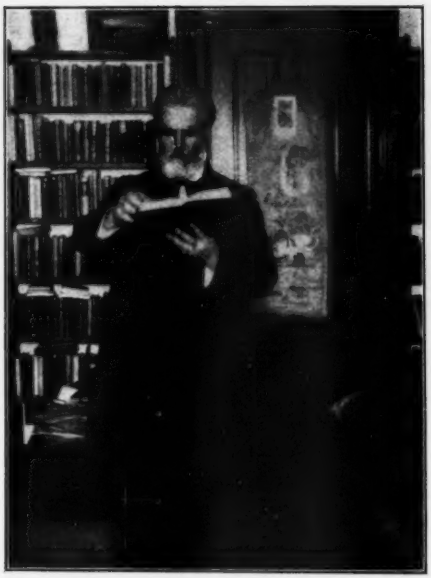
A PHOTOGRAPH TAKEN BY THE LIGHT OF THE MIDNIGHT SUN IN THE MONTH OF JUNE.

EDWIN MARKHAM.

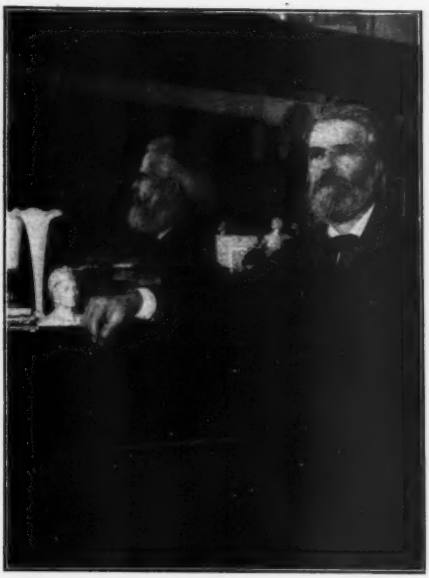
ALTHOUGH "The Man with the Hoe," Mr. Markham's poem on the famous painting by Millet, was published for the first time hardly more than a year ago, it has already aroused more interest and comment than any poem by an American author that has appeared within the last decade.

"HERE IS WHERE I WRITE MY POEMS. A LARGE, WIDE TABLE, WITH PLENTY OF BOOKS WITHIN READY REACH."

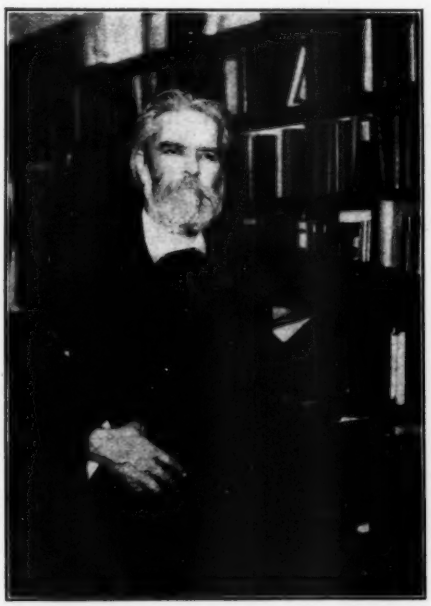
Copyright, 1900, by C. Montgomery McGovern.



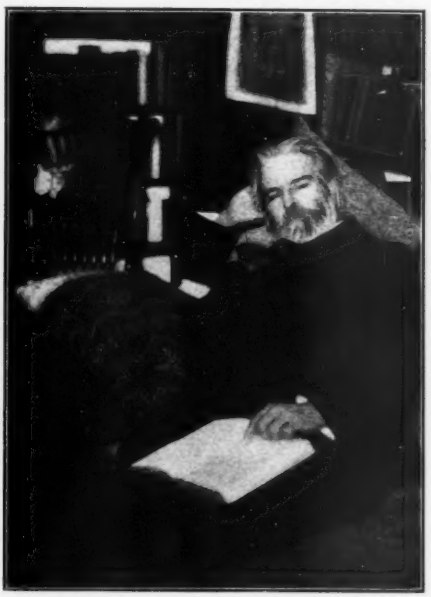
"READ SOME OF MY POEMS? YES, WITH PLEASURE. MY 'MAN WITH THE HOE' IS NOT MY BEST. IN FACT, I LIKE SEVERAL OTHERS BETTER."



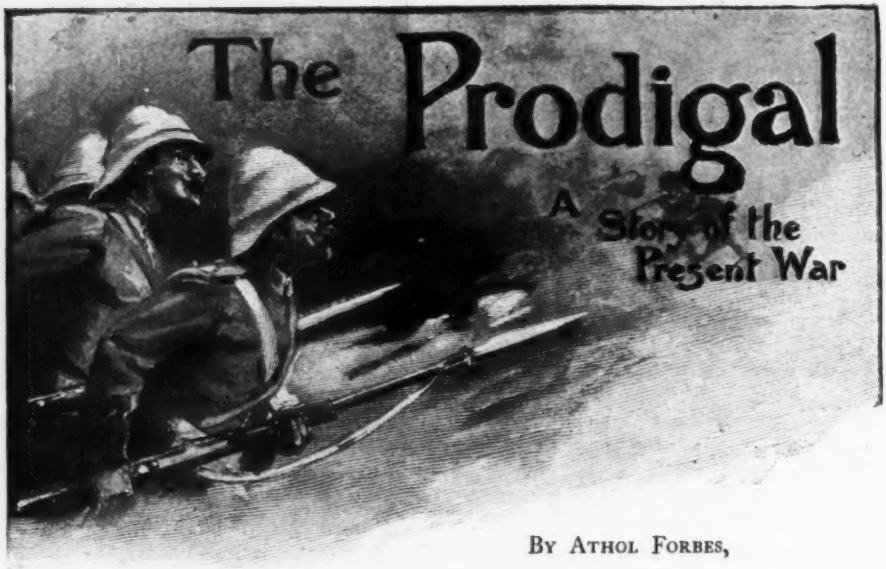
"IT IS NOT THE RICH I WOULD DENOUNCE. RICHES TO SOME PERSONS ARE JUST BOTH TO THEMSELVES AND TO THE WHOLE OF MANKIND."



"I AM PROUD OF MY LIBRARY. IT HAS FREQUENTLY BEEN SAID TO BE THE FINEST COLLECTION ALONG THE PACIFIC COAST."



"MY READING I DO IN THE AFTERNOON; MY WRITING IN THE MORNING. MY FAVORITE AUTHOR? WELL, AMONG AMERICAN POETS I RANK LOWELL FIRST."



By Athol Forbes,

Author of "A Son of Rimmon."

He stood among the crowd watching the men as they landed from the transport. It was his old regiment. His thin face was deathly pale—every now and again the muscles twitched with suppressed emotion. There arose on each side of him the sound of cheering. How he would love to join in! But not a sound came from the tightly compressed, bloodless lips.

As each company landed it marched at once to the train, the engine of which kept up an incessant hum as if instinct with life and eager to start. Six years ago—it seemed ages to the outcast—Dick Raines was an officer in this regiment; but limited means, an expensive mess, cards, and drink—well, no need to go into further detail. He was not the first who has sought another country under a cloud.

Tramp! Tramp! Tramp!

How greedily his eyes followed his old comrades in arms. Had he not trained them for this? He wondered whether they would recognize his voice if he sang out an order. Men whom he had known as recruits were now bustling non-coms. Suddenly the light came into his eyes, and he touched an officer on the arm. His old comrade swung round sharply, and looked for a second at the gaunt, starved man, whose clothes, never made for him, hung upon his framework of bones like a collapsed parachute. He colored beneath the haughty scrutiny of his former subaltern.

"Good God, Raines, is that you?"

There was no hesitation about the hand that went out to him with the strong grip of a warm love. There was no time for questions, nor would Major Riddle have asked any. The two men looked into each other's faces, and understood without words.

"Come on board the train," he said to his ruined comrade. "We'll manage it somehow. We are ordered to go straight to the front, fortunately.

"He's a reserve man," he said to the sergeant, "and is coming as an extra servant to me. Rig him out at the first opportunity."

Once more at the station, just before the train started, there was an opportunity for exchanging a few words.

"Riddle," he whispered hoarsely, "if I pull it off you can let it be known; but if I fail——"

"All right, old man, wish you luck; you have had sufficient of the other thing," the Major replied.

The derelict of society turned away, but already there was a change in the man. He was no longer a drifting wreck; there was an elasticity in his step, a brightness in his eye; he had pulled himself together. In a few seconds he was as hard at work as any man.

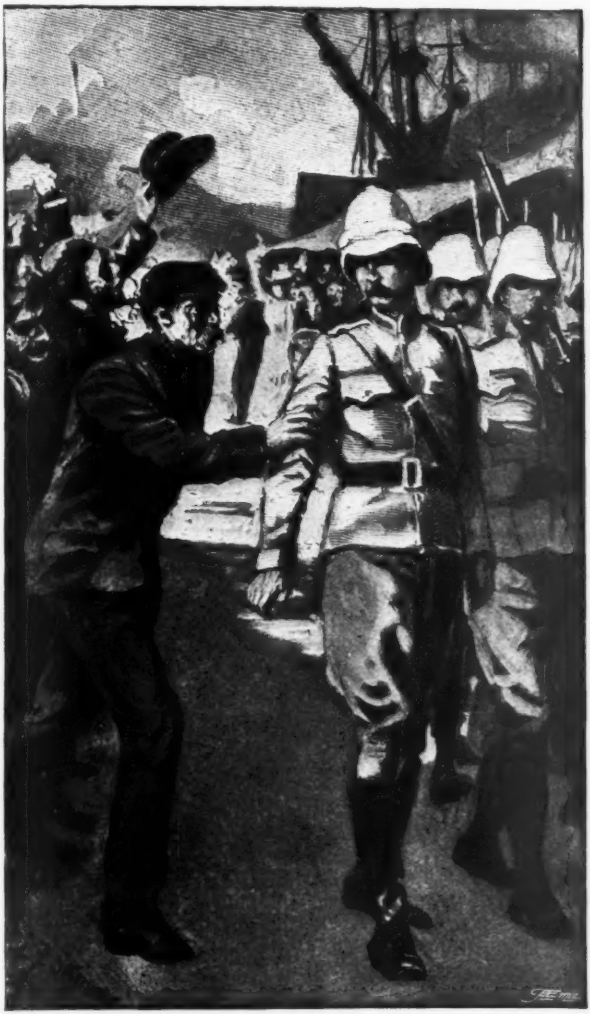
A good meal put fresh life into him. He listened to the rough banter of the men, and drank in all they said, greedily, as they talked of the demonstration at Waterloo when they left London, and what they meant to do for the Boers when they got a chance.

"Isn't there a pipe for Pepper and Salt?" said a youth as the train started.

This reference to Raines's seedy tweed suit tickled his companions, but a pipe was speedily forthcoming with plenty of tobacco, and he did not mind what they called him. He was only too thankful to escape the miseries of the last seven years; only too glad at the prospect of a chance to redeem his honor.

For a while the damning piece of paper—the cutting from the "Gazette" that told the public that Her Majesty had no further need of his services—was forgotten. For seven long years without intermission it had scorched and blistered his memory like a living coal; now for the moment he had peace from the tormenting flame of a real hell.

The very first station at which they stopped for the engine to replenish its supply of water, they received the news that the Boer ultimatum was officially confirmed, and that the Transvaal troops had crossed into Natal.



HIS OLD COMRADE SWUNG ROUND AND LOOKED FOR A SECOND AT THE GAUNT, STARVED MAN.

"God help the Boers!" shouted the excited bystanders as they looked at the men eager for the fray. From the papers Raines learnt that they were to join General White's column, and that it was generally expected that they would be among the first to be attacked.

In camp, "Pepper and Salt," as he was generally called, was among the most popular of the men. An eager light shone in his eyes, and, in gratitude for the chance placed within his grasp, he could not do enough.

"Don't kill yourself, Raines," said the Major one day. "You still have it to do yet, and it will be warm work when it comes."

The night before the fight at Glencoe, in the privacy of the Major's tent, they shook hands once more.

"—And my mother, Riddle. You will see her and tell her all—if I pull it off."

A pressure of the hand was the only reply.

That night all slept at their posts, ready to spring up at a moment's notice. The men were eager, but more serious, recognizing the grim work before them on the morrow. Raines was restless. It was with an exclamation of delight that he saw a faint streak of light in the east. Presently the sergeant awakened them with a rough order to fall into rank.

As the light in the east grows brighter, a body of men start their march forward, and, as the sun shows itself, the business of the day begins. A mist surrounds them, but the booming of the big guns and the harsh growl of the smaller ordnance tell that the fight has begun. As the sun gains power the mist lifts, and puffs of smoke dot the enemy's position; but no order is yet given to the regiment to fire. Presently there is the zip! zip! of the Mauser bullets. A man marching beside Raines falls dead; then suddenly the intermittent firing gives place to a continuous rattle, and bullets go spat, spat into the earth; but many find a fatal mark.

The captain halts his company as the zone of fire is reached, and the regiment begins to advance alternately in squads, in rushes, from one bit of shelter to another. One line then lies down and fires, while the other makes a dash; so the distance to the murderous guns is lessened every three or four minutes. The company in which Raines found himself is well to the front; behind, the supports, on coming up, deploy into squads, following the same tactics. Each time they fall to the earth Raines gnaws his mustache with impatience. They are getting nearer.

"Do not expose yourself so much," sings out a lieutenant to Raines. The next second the officer falls on his face, with a bullet through his head.

"All right, lads, we will be among them with the cold steel in a second or two now. Don't be too impatient!" Raines shouts, as another officer drops, and a few spring up as if to rush the enemy.

Major Riddle stands up and looks back at the advancing battalions, gives a nod of satisfaction, and crouches down again.

When the reserves get up Raines knows that there will be a volley, and then the whole line will rush in with a mad yell.

"Steady, lads, steady!" shouts the colonel, who is one of the "come on" officers. Men are falling quickly, and their comrades are anxious to do the final rush, and more than one is forcibly held down by his fellows. They are within a hundred or so yards now of the enemy. Raines has got complete mastery over himself. Once more he feels an officer and a gentleman. The colonel notices this. "You look to these men," he cries, indicating the fragment of a company that has lost its officers. "You know the work in hand. They must be kept quiet until the line is formed for the final volley and charge."

"Keep down, keep down, men," shouts Raines to his new charge, "and we shall be in first. Meanwhile, pump in the lead." His stentorian tones ring out clearly in the maddening roar and rattle of the battle.

"Fix bayonets!" What a relief this order means. The squads are swinging into line—a few seconds for the panting

men who made the last rush. Two sharp, angry volleys rattle out, then without another word the line springs forward, and nothing can withstand its deadly impetus. The charge becomes a race. "On, Fusiliers!" shouts some one, and all are plunged in smoke. They are plucky men behind those earthworks, and they remain to pour in a murderous fire. Major Riddle is close on the heels of Raines; they have outstripped the rest and are among the gunners. Raines has kept intact the contents of a revolver. He leaps upon a gun which determined men are about to fire, but its last message shall not be against England. Each shot in Raines's revolver goes with deadly aim, but the adjacent piece is discharged and sweeps into eternity the men who are behind him. In a few seconds he is grappling with the second gun.

"Bravo, 'Pepper and Salt!'" bawls a Fusilier, clubbing right and left with his rifle.

"That beggar shall have the V. C. By Heaven, he shall!" shouts the colonel as he cuts and thrusts in the hell that reigns around him. There breaks out a roar that only English throats can give, as the Boers are sent in headlong flight down the other side of the hill, hotly pursued. The battle was won.

"We must find him, Riddle," says the colonel, as they come back from the pursuit. "The man fought splendidly. If ever a man deserved the V. C., he does."

They find him amid a heap of slain, or what is left of him, for the Unseen Hand has gathered his noble spirit into that haven where war is not, and brave spirits are at rest.

The colonel bends down and gazes on the white, upturned face of the dead.

"God in heaven, its poor——"

"Yes; he wanted a chance, and he wanted us to write to his mother."

TO ———.

I.

THE love-strings of my heart were tuned
To one sweet chord by thee,
And thy dear hand shall strike them soft,
And waken melody.

II.

The instrument is truer far
Than those of man's design;
Its answering echoes breathe a strain
Both human and divine.

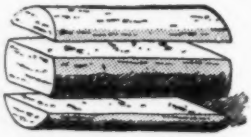
III.

Thy touch is one of tenderness—
The notes ring clear and strong;
Love is the theme, so it shall be
An everlasting song!

G. P. L. F.

By Caley Wainwright.

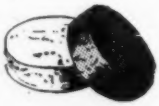
Both toy-making and model-making afford considerable amusement to a vast number of people, nearly as much amusement, in fact, as the destruction of the results do to the mischievous young folks into whose loving, but decidedly rough, clutches they chance to fall.


CORK CUT LONGITUDINALLY.

But building either toys or models requires more time and more attention than many can afford to devote to it. Miniature modelling, however, of such a kind as I purpose to describe, involves a minimum of skill, no expense, and an unlimited amount of amusement.

CORK.

What are your tools? Well, a really sharp penknife, a pencil, a pen, some sandpaper, a pair of scissors, a bottle of good gum, some pins and hairpins, a spool of thick thread, a bottle of black ink, a paint-brush, and some blue, red, yellow, white, and black paints comprise a splendid outfit. Our materials in the first place are


DRAUGHTSMEN.

CORK CUT IN SECTIONS.

matches, ordinary wooden matches, and a supply of corks—all sorts of corks—medicine corks, claret corks, champagne corks, and big, wide corks. The chief of these, however, are the ordinary claret corks, for they are more regular in shape, and, as a rule, of good quality.

Commence operations by cutting one of these corks in half. The best method of doing this is to place the centre of the blade on the cork; then, pressing it with the left hand, push the knife backwards and forwards, allowing the cork to roll. Having cut the cork in two, take one half and halve it. Each of the portions will be a quarter of the whole, and I will refer to such as a "quarter." Dividing one of the "quarters" gives two "eighths," and dividing one of these provides us with two "sixteenths." Cutting a cork longitudinally, as in the illustration, is more difficult, but only a matter of one or two attempts. Out of the central bit rectangular strips may be cut, or a domino can be made.

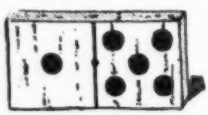
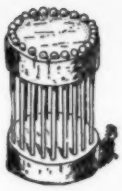

DOMINO.

FIG. 1.

Forty "eighths" well rubbed with sandpaper will give us a set of draughtsmen. A quarter section of a cork carefully cut square (Fig. 1) will produce a cube, and this marked with dots of

DICE.

BALL.


FLY CAGE.

ink will make an excellent die. Two "eighths" joined by pins will furnish us with a fly cage. A set of chessmen seems an ambitious effort, but in reality is quite simple. For the king take a long wooden match and press it through the centre of two "sixteenths," then through a "quarter," the bottom edge of which has been rounded off on the sandpaper. For the base use an "eighth," and for the crown another "eighth" with a cross cut on it. For the queen proceed exactly as with the king, but make the match shorter, and instead of a crown put a small ball (easily made by rubbing off the corners of a small cube). For a bishop pass a match through a "sixteenth," then through a large ball; and for a base, as, in fact, for all the bases, use an "eighth." The mitre is a small medicine cork trimmed nearly to a point, and cut with a groove up each side and across the top.

KING.

QUEEN.

CROWN.

The body of the knight is a large ball. The head is a small medicine cork fixed on the match at an angle, with another small cork fastened at an angle to the first cork by a pin. A notch forms the mouth. The eyes and nostrils may be burnt with a hot key. Two pieces of match form the ears. Half a cork, ground on the sandpaper at the edges and end, and surmounted by a "sixteenth," with an "eighth" for the base, will form the castle, or rook. An "eighth" surmounted by a small "quarter" forms a

BISHOP.

Sharpen a pierce a then take the round cardpush the through the add another to hold the and behold a

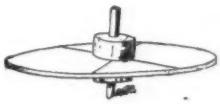
KNIGHT.

ball, with a for a base, pawn. match and "quarter," bottom of a board box and match centre. Then "quarter" cardboard, splendid top. A little paint on the cardboard will add to the general effect.

PAWN.

Take a cork from some open-necked bottle, polish it on the sandpaper, and insert four matches tapered off towards the bottom. On top of the cork gum a circular piece of cardboard, and behold a rustic table. Stick four short pieces of match into an "eighth," and you have a stool.

ROOK.


TOP.

Add two more pieces of match on the upper side of the "eighth," join them with a strip of cork, and you have an excellent chair. An "eighth" squared off with four very small pieces of match at the four corners furnishes a footstool.

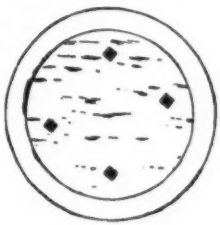
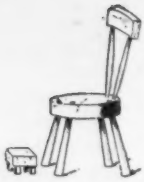


TABLE TOP.

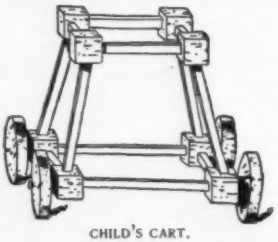
A child's walking cart is not difficult to make. Take four cubes and join them with four matches. In the top of each cube place a match, and join the top of

TABLE.



CHAIR.

these matches with a smaller frame of matches and cubes. Pass a pin through the centre of each of four "eighths" and pin them into the lower cubes. The cart is then complete, with wheels, and will run easily and well.



CHILD'S CART.

A little girl can be fashioned out of a champagne cork. Two pieces of matches form the legs, an "eighth" the base. Two more pieces of match make the arms, and a small ball fastened with a pin or match to the top of the cork is the head. A little wool or worsted will supply the hair. A basket can be made out of a nutshell, and a piece of blue paper carefully gummed on will add an apron to the young lady. The child is a small ordinary cork upside down, with two matches stuck into an "eighth" to form legs. The arms and head are bent matches; a ball on a fragment of match is the head. A ring of stiff paper over the top of the ball makes a hat. A piece of white paper provides baby with a pinafore.

GIRL AND SMALL BROTHER.

A RUSTIC.

The rustic gentleman is a champagne cork upside down. The swellings are his breeches. Two pieces of twig are his legs, while two bent pieces of twig fastened by pins form his arms. A ball of cork is his head. The brim of his hat is made of a ring of paper, the crown being the top of the ball painted black.

STORKS.

A piece of cork with one end rounded and the other sharpened to a point forms the body of mamma stork. The legs are two hairpins, her neck is a match, her head is a small ball of cork, her beak a sharpened match. Her offspring is similar, but on a smaller scale. An inverted cork of the pickle-bottle species (Fig. 2) slightly hollowed, and filled with water, makes an admirable pond.

A rocking-horse can be made out of three corks, cut to fit at proper angles. The ears are pieces of glove kid, as also the bridle and the reins. The mane and tail are black worsted or wool; the legs are matches stuck into strips of cork, which hold together by means of pins the cardboard rockers.

A number of simple toys can be made of bamboo. Cut off a piece from between two notches. Pierce seven holes, six equidistant, commencing at one end; and the seventh, for the mouthpiece, at the opposite end, which end is plugged with a cork. The result is a first-rate flute.

FIG. 2.

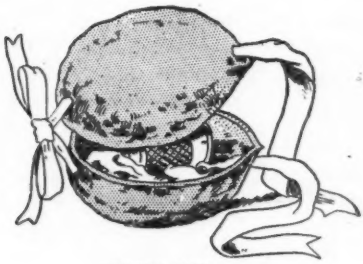
Take, again, a small piece of bamboo and slice down a strip without breaking it

RING (BACK VIEW).

RING (FRONT VIEW).

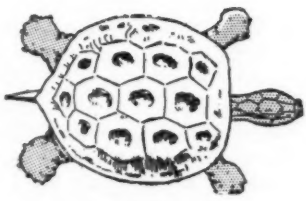
BASKET.

HOODED CART.



THIMBLE CASE.

FIG. 4.



TORTOISE.

MATCHBOX.

GARDEN CHAIR.

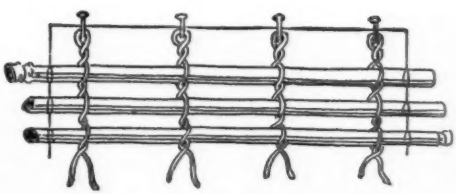
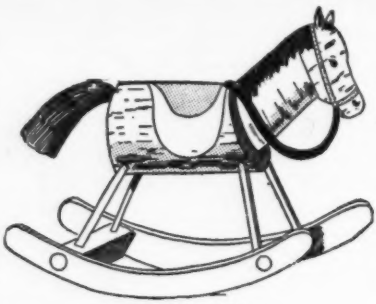


FIG. 3.

off. Out of the opposite side cut an opening about two inches long. Now bore two holes for a wooden handle to revolve in at right angles. On this handle is fixed a notched wheel, which acts on the cut strip, and forms a sort of policeman's rattle.



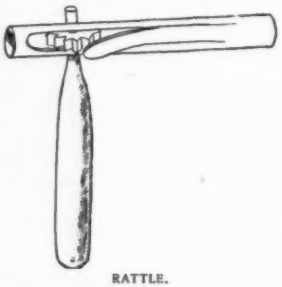
ROCKING-HORSE.

Now for a windmill. Cut off a piece of bamboo with a notch at one end and none the other. Split this latter end slightly to hold a square piece of cardboard. At the opposite end, by means of a pin, attach a strip of bamboo so split that at either end there is a square piece of cardboard held at an angle. By means of another pin fix the horizontal piece of bamboo on an upright so that it revolves. A light breeze will set the mill merrily to work.

FLUTE.

The two blacksmiths are two pieces of bamboo fixed at their bases to two strips of wood. Their arms are matches and their hammer-heads are corks. As the pieces of wood are slid backwards and forwards, the two smiths deal terrific blows on the cork anvil.

The Eiffel Tower is made from a piece of bamboo with a notch at one end and not at the other. The latter end is split twice (at right angles), so that four strips are formed for legs. Four other strips of bamboo, bent in semi-circles, are tied to the bottom of the legs, and act as stays. Four straight strips bound round at the top of the semicircles make the lower platform. Four smaller pieces gummed on higher up make a second platform. Two thin pieces of bamboo bent over make an ornamental cage, with a small cork, surmounted by a flagstaff, gummed above them.



RATTLE.

By means of a knife very pretty little baskets may be cut out of hazel-nuts. A triangular file serves to finish off the edges. A ring also can be cut, but great care must be taken not to split the shell. Animals, of somewhat uncertain species perhaps, may also be fashioned from nutshells. Flat, open baskets can be cut out of prune nuts, and will be useful for dolly's keys.

A matchbox can be made by cutting out a disk and a somewhat larger ring of cardboard. Pierce them with the same number of holes, and join them with pieces of straw. Thread these uprights with ribbon and the matchbox is complete. A garden seat can be made with straw and thin wire. The back and seat are made by twisting the wire with a blade of straw in every second turn (see Fig. 3). The legs are straws threaded, and secured by wire.

WINDMILL.

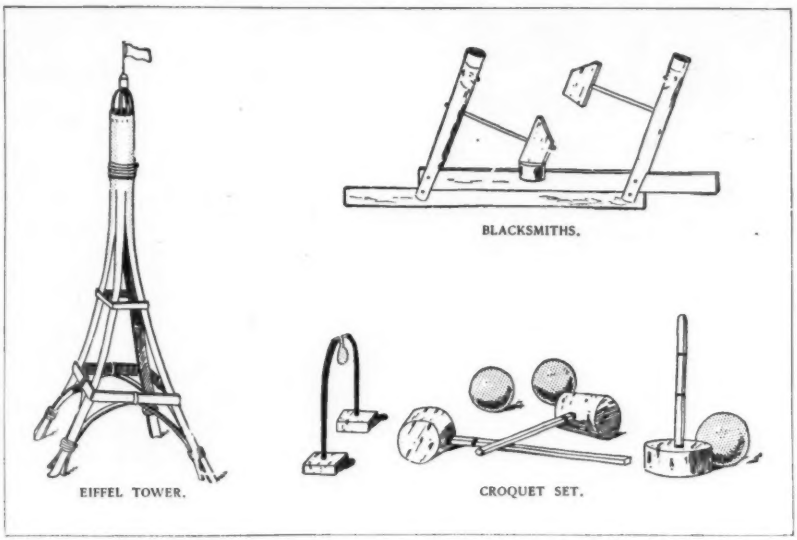
Out of nutshells numbers of miniature toys may be constructed. I have already referred to hazel-nuts, but walnut shells are even more adaptable. Take a shell and pierce a hole through each side near the rim. Pass a wooden match through them and secure two cork "eighths" for wheels, making them quite secure with pieces of cardboard gummed on either side. A short piece of twisted wire passing through a hole in the front forms a handle to

PRUNE-STONE BASKET.

draw the chariot, and half a shell gummed on the top of the body of the vehicle forms a hood.

By threading two walnut shells with narrow ribbon, and gumming in a small piece of silk as padding, an admirable thimble case is constructed.

A tortoise can be made by cutting a visiting card so that the head and legs of the tortoise project from under a walnut shell gummed over it (Fig. 4). In the centre of the card a hole must be cut, and before fastening on the shell insert a marble, and when the card and shell have been gummed, the tortoise will glide in a dignified manner up and down any inclined surface. Finally, a splendid croquet set can be made in a very few minutes. Medicine corks, with the ends rubbed nice and square on the sandpaper, form the mallet heads, and matches the handles. A match neatly painted and stuck into an "eighth" will make a stick. Hairpins bent over and stuck into square pieces of cork will make hoops, and marbles will serve excellently as croquet balls. Played on fairly thick cloth, so that the marbles will not run too freely, great fun may be had.



O Absalom, My Son!

By W. C. Morrow.

Colonel MacDonald felt an icicle strike through his heart when an orderly dashed up with a command from the General to charge the ditch. It was not that the smallest drop of cowardly blood had a place in his veins. Indeed, he was possessed of that cool and dogged order of courage which cuts the deepest havoc in a long and stubborn battle, and which fights bravely on after the volcanic fires of more impetuous natures have expended their forces in spectacular slaughter or gone down in glorious extinction. To send such a man as Colonel MacDonald into such a charge as this was one of those grotesque blunders to which the madness of battle gives birth. Far better would it have been to send a dashing hot-head, a man with blazing eyes and a wild shout in his throat, into that awful, quiet maelstrom of reserved lead, where the noise and flame of courage would sweep the field.

It was not that Colonel MacDonald feared for his life; but he knew the quality and temper of his regiment, which were his own infused. In the famous corps to which it belonged, his regiment was accounted the mainstay, the rock against which furious charges dashed themselves to pieces, the pivot upon which rout was swung round to victory. It was a wall, not a hurricane; an immovable iceberg, not a boiling torrent. How would it behave in this new and strange emergency? A stayer of the panic of others, how would it handle a possible panic of its own? A dam to restrain the flood, what incoherency and disorganization might it develop as the flood itself?

The odds against Colonel MacDonald were tremendous. The enemy, securely intrenched, outnumbered him fearfully; but it would still have been many times stronger had it had but a fourth of his numbers. Between his position in the trees and the yellow line of new earth marking the enemy's ditch, a mile away, was a perfectly level field, recently planted—a pasty soil deeply ploughed, and made soft by rain. It was an infantry regiment that had been ordered to charge the ditch across that field. The necessary slowness of the progress, the exhausting labor of it as the men would sink nearly to their knees at every step, the total impossibility of making a dash, the deadly aim that the enemy could take as it waited in perfect security until the whites of the charging men's eyes could be plainly seen—the whole ghastly picture swept through the Colonel's mind.

And there was another thing. The complexity of the human heart is unaccountable. The bravest soldier may at one time face death with the resignation of a Stoic or the recklessness of a battle-drunk madman, and at another quail when the shadowy picture of a loved and suffering one thrusts itself between him and his leaden destiny. At times there are causes vastly more potent than the fear of death

to cool the hot iron in a soldier's heart; there are transitory moments of suffocating, honest, manly doubt whether it be nobler to die for one's country or live for the sake of cherished hearts whom one's death would rob of life without satisfying the grave. Not an hour ago Colonel MacDonald had held in his arms his wife and his one child, and he felt their sacred tears where he had permitted them to dry upon his cheek. They were so near yet—these two loved ones — and how unthinkable it was that they should see him—either an impotent heap of breathing flesh, or riddled into

THE ORDERLY SALUTED AND GALLOPED AWAY.

In spite of his masterly composure, the Colonel stared in dumb astonishment at the orderly.

"Is the General aware of the character of the ground over which I am to charge?" he inquired, with a strange hesitation.

The orderly looked surprised. "He said nothing about it, Colonel," he answered.

"I suppose," resumed the Colonel, speaking with great slowness and calmness, as though unconscious of his words, "I suppose the General has ordered meanwhile a flank attack on the ditch—round through the woods there to the right—to send an enfilading fire into the enemy while I charge."

"That is impossible, Colonel; there are no troops nor batteries for the purpose."

The Colonel stared so strangely at the orderly that the brisk young man wondered. An embarrassment that he felt without understanding caused him to lower his glance, as though he too shared the unconscious guilt of the blunder. Then, wheeling his impatient horse, he asked:

"I shall tell the General——"

"That I will charge," answered the Colonel quietly.

The orderly saluted and galloped away.

The scene had been witnessed by the whole regiment, lying on its guns and idly listening to the shells that tore screaming and bursting through the woods, and by something akin to unanimous intuition it divined the purport of the order, though it had been heard only by the Colonel and his aides. The men were veterans, seasoned, cool, self-contained; but their glances met all down the lines in a kind of dismay that had no words for its expression.

Then at once orders were bearing the message of death, and the musical notes of the bugle sounded clear and round above the diapason of the singing shells in the trees. The Colonel, with drawn sword, galloped to the front, turned, faced his

men, and without a word raised his sword aloft, wheeled about, and headed slowly for the ditch. In that brief moment his men saw a deep pallor that they had never found there before, but behind it the familiar quiet gleam of the eye that meant steadfastness to the end. That was what they wanted, what they had never failed to find when the crisis came; and, taking it into their hearts, they sprang forth from the sheltering trees into the open.

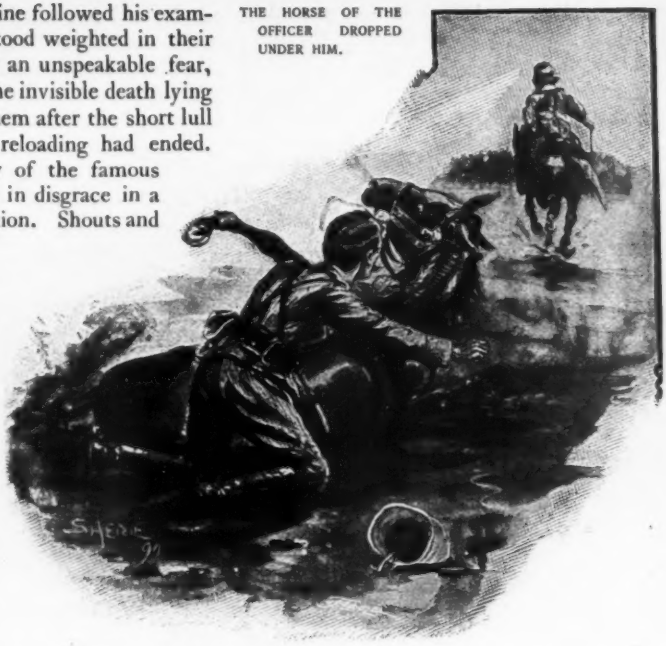
They took the soft earth bravely at first, going at a double quick; but the Colonel checked them, and passed the order down the line that they should move slowly. His purpose was to reserve their strength until the glinting barrels of the enemy's rifles and the cautious upraised hats above the earthworks showed that a deadly aim was being taken; and there was time enough for that. Far to the left the battle roared, and Colonel MacDonald, holding the extreme right, knew that a heavy responsibility rested upon him. Should his regiment be swept away, his General's right would be turned, for concealed in the woods beyond the enemy's trench were batteries awaiting the opportunity that the intrenched regiments would open.

Half the distance across the field had been covered, and as yet not a single puff of smoke had risen from the earthworks. Even the batteries in the woods were silent. Colonel MacDonald's men trudged slowly forward, in perfect order, their glinting rifles showing lines as straight and firm as on a holiday parade.

Another quarter of a mile had been covered, when all along the line of earthworks rifle-barrels began to slip over the top, and here and there a hat was uplifted above the yellow crest. The Colonel faced his men —a splendid target for the enemy, but sitting in massive, nonchalant disregard of the fact. Gathering up the reins after calling a momentary halt, he galloped down the line, and in a few words sent the iron of his soul into the souls of his men. Then came the dash, the men crouching low as they floundered on through the mud.

First came a solitary greeting shot from the works, then another, then a blazing, tearing crash that sent forth a flying wall of lead. Men dropped by the score, but there came not a groan from the hurt and the dying, not a shout nor a shot from the living. The Colonel pressed on, waving his sword aloft.

THE COLONEL PRESSED ON, WAVING HIS SWORD ALOFT. . . . BUT THE MEN STOOD TRANSFIXED BY AN UNSPEAKABLE FEAR.



THE HORSE OF THE OFFICER DROPPED UNDER HIM.

The officers of the line followed his example; but the men stood weighted in their tracks, transfixed by an unspeakable fear, staring in terror at the invisible death lying in wait to throttle them after the short lull from the enemy's reloading had ended. Thus had the glory of the famous regiment gone down in disgrace in a new and awful situation. Shouts and implorings from the officers failed to move the men. Stinging reproaches for their cowardice brought no quickening of their pride. They stood gazing helplessly at the yellow dam over which the river of death was pouring. Then came a wavering, a shiver, from end to end of the line. Glances were turned backward toward the sheltering trees, a few rifles were dropped, and the beginning of what would have been the most shameful rout in the history of the war was at hand.

But a wonderful thing occurred. Those looking backward toward the sheltering forest saw a small child tearing toward them from the rear, galloping furiously on a small nimble pony; and they recognized in the oncomer the Colonel's little son Robert, whom he and the men of the regiment called Tod. In what manner he had escaped from his mother, how he had followed and found his father—these are not things to discuss while the hearts of seven hundred surviving men are turning to water in dread of another winged wall of lead.

Dashing through the wavering ranks, the child drew up at the side of his father, so maddened by the failure of his men and so urgent in his appeals to their fealty that he had not observed the child's approach. To see his son here at this most wretched of all the moments that could occur in ten thousand lives put upon the Colonel's strength the very last strain that it could bear. Not heeding the flaming cheeks and dancing eyes of the child, nor the exaltation and the limitless affection that filled their wide blue depths, the Colonel harshly ordered a mounted officer to take the boy to the rear; nor would he permit his agonized heart to comprehend the look of mortification and grief that dimmed the glowing lustre of the childish face upturned to his.

"Papa!" pleaded the little man, "don't send me back. I want to go where de men has de bees dat sings in de air. Dey was singin' all awound me when I was widin' froo de fiel'. Please, papa!"

At that moment a second flying wall of lead swept the open. The horse of the officer who had seized the pony's bridle dropped under him. The little man, seizing the moment of freedom, sent his whip into the pony's flank, and the nimble beast leaped ahead toward the yellow line. The Colonel dashed after him, and the other officers who were mounted; and

the paralyzed soldiers, seeing the child leading the charge, and swinging his whip, and shouting in his childish, piping voice to come on, felt the old fire boiling in their blood, the old iron in their souls. With a mighty shout they stormed the works, and the glory of the carnage of their bayonets in the ditch surpassed all reckoning. On they swept over the choked ditches filled with the regiments they had crushed, on to the battery in the woods which they captured; and that is the story of the wonderful charge that turned the enemy's left that day.

After the din had ceased, while yet the air reeked with the grime of burnt powder, a white-faced man galloped along the line, searching through the haze with a frenzied eagerness for something—something infinitely precious. What saving of a paltry nation's cheap honor could compensate for one overwhelming, unthinkable loss?

The gleaming, eager eyes at last found what they sought. The childish bare curly head was pillowed on the dead pony's neck, and a childish arm was caressingly thrown over the dead pony's head. The flaming roses were gone from the velvet cheeks, and the wide blue eyes, whose last look upon him had been one of bitter disappointment and reproof, were closed. The wretched man, mastering a choking sob, approached his boy and took him gently in his arms. The blue eyes opened, stared vacantly a moment, and then lighted up with a happy recognition when their glance fell on the Colonel's face. A turbulent joy bound the strong man's tongue in chains.

"Papa," cried a childish voice, "is dat you? I'm so glad! I'm tired, papa. Can't you get yo' Toddy boy some water? Oh, dere was so many, many bees, and dey singed and singed, an' one o' dem naughty bees, he bit yo' Toddy boy wight here"—indicating a small, blood-soaked shoulder, from which a small arm dangled helpless—"an' it hurted, but yo' Toddy boy didn't cwy."

LOVE THE WIZARD.

He comes to-night; he'll hear me sing
The song he gave me long ago,
When first I learnt that Love is king,
Yet knew not how to tell him so.

Close by my side he'll surely stand;
Our eyes will meet—so long apart—
Then Love shall wave his magic wand
And mesmerize my darling's heart.

If Love has eyes, as poets say,
He must have ears to aid his sight;
God grant the tender love-words may
Teach *him* to read my heart aright.

PHILIP HEMERY.

TWO OF THE FOUR BLAST FURNACES AT DUQUESNE, PA. CAPACITY 600 TONS MOLTEN IRON FOR EACH EVERY TWENTY-FOUR HOURS. THE FURNACES ARE AT EACH END: THE EIGHT OTHER CYLINDERS ARE THE "STOVES" IN WHICH THE AIR-BLAST IS HEATED.

STEEL-MAKING AT THE CARNEGIE WORKS.

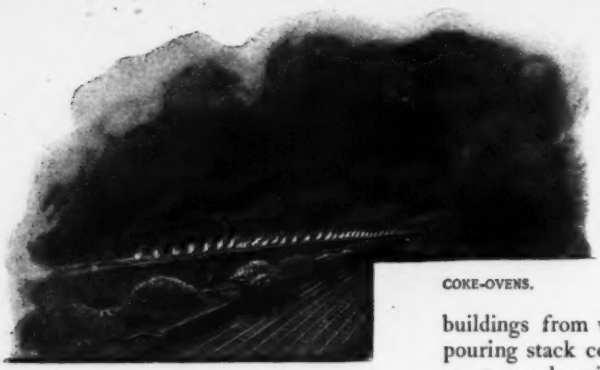
(NO. 2 OF THE SERIES "GREAT AMERICAN INDUSTRIES.")

By George H. Perry.

Long before the train lands you at the grimy station in Pittsburg, you hear from your fellow-passengers strange things of this City of Incalculable Riches;—especially if you appear impressionable and credulous. Some of the stories have all the fascination of fairy tales, although they centre, not on fairy treasure of gold and gems, but on other treasure of gas and oil, and especially of coal. You are told of thickly settled city districts wherein the lucky householder keeps his hearth-fire going with coal he digs from his cellar bottom. You are told of streets cut through suburban hills where every scrape of the surface revealed coal deposits, so that the steam-digging machinery was run by an occasional shovelful of the material it dug. You are told of the lamented days of the natural gas debauch, "when it was cheaper to let the fires burn all the time than to waste matches in relighting them." And the stories of "strikes" in oil and gas make the aureate yarns of California and Klondike seem like tales of squalid poverty.

From the car windows an occasional view of a shallow, yellow river flashes and vanishes, and there are glimpses of ungainly steamboats thrashing the water with naked stern-wheels wide as the boat's own width, high as the boat's hurricane deck. You are told that these are coal boats, and that the one yonder will shortly be on her way to New Orleans (the heavens sending sufficient depth of water), pushing a floating island of coal, measured in forgotten hundreds of thousands of bushels.

It is growing darker, but the darkness is



COKE-OVENS.

not that of twilight alone. It is a darkness that is thicker; it is an oily dark, and it has a perceptible odor. It shuts in very fast; the landscape blurs into a smoky brown. But at short intervals there come astonishing stretches of fire and flame and colored smoke; a hell-scene a half-mile long, repeated every few minutes. If your eyes are quick you can analyze an acre or two of this glare into hundreds and hundreds of separate five-foot flames; dull red, half-choked with smoke. Picture a thousand of these, flaring away in the brown dark, and then another thousand, and then five thousand! There comes to your mind an appreciative recollection of that damnatory hymn wherein each sinner is promised a furnace to himself.

"Coke-ovens," remarks your seat-mate, without taking his eyes from his book. "This is the Connellsville region; finest coking-coal deposits in the world."

More coal! And you begin to understand why Pittsburg is called the "Smoky City."

Shortly you have other reasons to comprehend, for there in the valley is a clump of smoke-stacks thick as the trees in a forest, and each one doing its whole duty. The train is at speed, yet the seconds beat out into full minutes, and there is no break in that serried rank. And when they seem to end, it is but to have another forest of them begin. And so, for mile after mile, the river-bank is fringed with them, and with the squatty, flat-browed buildings from which they tower. Each pouring stack contributes its stream to a great, overhanging, smoky sea. But the scene is not all dark, for every instant it is shot across with fire. Yellow flames, blue flames, green flames flare and vanish here and there, paled to invisibility at intervals by blinding bursts of intense blue-white.

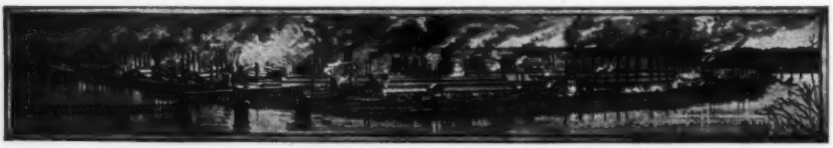
Your seat-mate is calling off localities: "Duquesne"—"Braddock"—"Edgar Thompson Steel Works" — "Homestead——"

Homestead? The name awakens memories. "These are the Carnegie Works, then?"

"A part of them."

Ten minutes afterward you alight at a grubby, grimy, dim-lighted station, and pass out into a grimy, smoky, half-lighted street. A hundred yards in front, the perspective fades into a dirty fog. A hundred yards behind, the dirty fog closes in again. Above –no sky, but a brown-gray mist almost to the roofs of the gray-brown buildings. You are instantly sensible that there is black on your face, that your nostrils are sooty. This is Pittsburg; the dirtiest, the busiest, and one of the most beautiful cities in America.

Pittsburg is a city of superlatives, of which "dirtiest" is the first noted, the least important, and the first forgotten.



"SMOKE-STACKS THICK AS THE TREES IN A FOREST."

The inhabitants run over a long list of the industries that centre there, and add to each one of them that sounding phrase, "the largest in the world." Thus they claim "the largest railroad and river tonnage in the world;" "the largest electric-machine plant in the world;" "the largest plate-glass plant in the world;" "the largest tumbler and chimney-glass plants in the world;" the largest tube works, coke works, air-brake works, steel-rail plant, railway-signal plant, crucible-steel plant, Bessemer plant—and a line or two of *et cetera* plants—in the world.

Chief, however, is Carnegie; meaning not so much the individual as the name. His personality, his public and private benefactions are for other writers and other occasions. It is Carnegie, the blast furnaces; Carnegie, the steel works; Carnegie, the railroad; Carnegie, the day's wages in a dozen forms, that you hear most about. It is the Carnegie Steel Company that has done the most (albeit in coöperation with other giants) to make Pittsburg what it is, and will do most to make it what it is to be.

Pittsburg is the greatest iron manufacturing centre in the world. Neither Sheffield nor Birmingham, neither Essen nor Creusot is even a close competitor. Pittsburg is the Iron City, yet there is not a pound of iron found within her capacious entrails. Coal she has about her in such vast quantities as to make the digging of the past hundred years seem but a scratch on the surface. But iron she has not, except as she brings it from afar. She is really the Coal City, and because of that she becomes the Iron City. For stern King Iron finds his mistress in Queen Coal, to whose softening influence is due all his power to benefit mankind. It is because it takes nearly a ton of coal (in coke) to make a ton of iron, that Pittsburg is the throne city of both regents.

This operation—the reduction of the iron ore to workable iron—is the first step in the process we have come to observe. We can see it at the Duquesne Furnaces, at Duquesne, seven miles from Pittsburg, and at present the outlying end of the long line of Carnegie plants, that extend up the Monongahela River from Pittsburg.

If you are provided with the proper pass you may enter the gates at Duquesne and feast your appetite for bigness to the full. First of all you are shown a mountainous heap of ore. It is almost a quarter-mile long, 300 feet wide, and perhaps sixty feet high. It is 60 per cent. pure iron, but it looks like a huge sand pile colored black and brown. Four hundred thousand tons it weighs, and is worth $2,000,000 in money.

This iron ore is brought largely from those marvellously rich deposits in Minnesota and Michigan, where the ore is found close to the surface, unmixed with rock or clay, and in the form of coarse grains looking like nothing more than black sand or gunpowder. It is dug by steam shovels like so much sand. There is little crushing or separating to do—nature has practically done it all. She has stored away unnumbered millions of tons of almost pure iron, in a form easiest to handle, and it is because we have discovered these colossal storehouses, and are drawing upon them with little more trouble than the stripping away of the turf that forms their roofs, that we are successfully competing now in the iron markets of England; because of that and a wholesale way of doing things, and the perfection of our mechanical contrivances. Our coal is cheaper too.

In front of this ore-pile are the furnaces. Imagine two colossal iron cylinders, like magnified stand-pipes, decorated at their tops with complicated machinery, and with their bases hidden under a rough shed. Between them tower eight slender smoke-stacks that arise from lesser cylinders. The two great "stacks" are the blast furnaces. The chimneys tower from the "stoves."

A blast furnace is not an easy thing to describe after you have seen it in the actual travail of production. It is a great, grim, roaring thing that lives in gloom, and is sedulously attended by a score of lesser demons—black-faced, silent, hurried, watchful. It is a thing of awful suggestion; strong in hint of quick disaster.

Once in a while it "breaks out." You are shown gaping holes where the roof was before the monster began to spit molten iron about. "What do the workmen do in such a case?" you ask. "Get out *quick!*" is the reply. Further questions elicit the information that sometimes they are not quick enough. "There's no warning given at all. A furnace may never 'break out,' or it may do so any time; you can't tell." A cheerful introduction to the monster, which makes you unconsciously imitate the silent watchfulness you see all about you.

This furnace is fed every ten or fifteen minutes with sundry tons of iron ore, coke, and limestone. It swallows and digests about 600 tons of the combination every four hours. It is fed by machinery, through a trap at its top. In the old days such furnaces were fed by hand—workmen dumped their barrow-loads into the liquid flame below, shutting their eyes to the gusts of smoke and gas. Sometimes there was more gas than usual, and the workman followed his barrow-load. No more of that now. In fact, from the time the ore is dug in Michigan, until it is converted into rails or beams or whatever may be its destined form, it is not "handled" at all. No more pick and shovel. Steam scoops, steel dumping cars, travelling cranes, huge dredges dragged at the end of wire ropes, hoists, conveyers, and gravitation do it all.

The furnace is of iron, lined with fire-brick. Where it is hottest it is water-jacketed. It is full of ore, limestone, and coke almost to its top. The coke (nearly pure carbon) burns fiercely, setting free immense volumes of combustible gas. This gas, instead of passing out at the top into the air and wastefulness, is carefully led by huge pipes to the "stoves" and there ignited. These stoves are simply large chambers of fire-brick, in which the gas burns viciously hour after hour. The brick walls and a "checker-work" of brick at the top retain and accumulate the heat. The "furnace seven times heated" was a chilly spot compared to these stoves. After eight hours of flame the stove is "hot," as the workmen say, and the word seems weak. That particular stove is then put "in blast," while the other seven go on heating. Enormous blowing engines force air through the "hot" stove and into the blast furnace. In passing through the stove, the air is heated to a temperature far above the thousand-degree mark. It is this blast of red-hot air pumped into the furnace that makes the carbon burn so fiercely. The temperature of the seething mass where the blast enters the furnace is close to 3,000 degrees Fahrenheit. Iron flows like so much syrup, the limestone liquefies, the whole mass is fluid at such a heat, and gravitation pulls the different elements apart. The iron, being heaviest, sinks to the bottom. The "slag," which is the name given to all the limestone and silica, and everything which is not iron, floats above. On the liquid at the bottom rests hundreds of tons of ore and fuel in a graduation of condition—from semi-liquid,

SECTION OF MODEL OF BLAST FURNACE, SHOWING CONTENTS BEFORE LIGHTING.

The blast enters by the "tuyeres," the gases of combustion pass out by pipes at the top. When in action, the furnace contents are liquid from the bottom to a level some distance above the tuyeres. The model shows the automatic method whereby a "bucket" of ore or fuel is emptied into the furnace.

TAPPING THE FURNACE.

through the white-hot and red-hot, to the comparatively cool at the very top.

This furnace is tapped every four hours, producing 100 tons of molten iron at each "cast." The tapping is a fearsome sight for one who sees it for the first time. An hour before, the furnace has been tapped at a level above that of the liquid iron, and the slag drawn off. The floor of the furnace shed is two feet deep in sand. Through that sand channels are cut, and through these channels the liquid stone has run; the sand is still fiery hot. Now new channels are cut converging toward the furnace, and at the spot where they reach the furnace wall, a dozen men are thrusting with a bar. You cannot see the spot aimed at, but you are told that there is an orifice in the furnace wall there, heavily stopped with fire-clay. It is at a low level—in fact, at the bottom of the furnace. A hundred tons of liquid iron seeks an outlet there.

Thump, thump, thump, with the bar, and a faint glow appears in the gloom. The workmen jump back and a single wiry man prods fiercely with a rod. The light glows, widens, brightens, then suddenly leaps to a blinding glare. And here comes the iron!

It ripples and dances along its channel like any innocent brook, if you can imagine such a brook turned to liquid fire. It is a pretty thing to watch. It throws out its playful spray, it has lights and shadows and eddies in it. It winds along its channel toward you, and fifteen feet away you feel a dry, fierce, blistering heat that makes you realize that if brook it is, it is one out of Hades. The workmen are busy with it; damming it here, leading it into side channels there, scooping spoonfuls out of it. You wonder if playful devils so employ their leisure where such brooks may flow naturally.

In the elder days of the iron craft (not so long ago either, except when measured by progress rather than calendar) this iron was run into a large number of short ditches, three feet long or thereabouts and allowed to cool therein. The result was "pig" iron. A small portion of the cast at Duquesne is still so utilized, but in substance the days of pig iron are past. Before the pig can be used it must be remelted, and that means more fuel and time and expense. Fuel, time, and expense are things carefully conserved by the Carnegie Works, and the iron that is wanted for immediate manufacture, once molten, is not allowed to cool again until it has arrived at its finished condition.

FROM THE FURNACES THE LIQUID IRON IS LED THROUGH CHANNELS AND SPOUTS TO "LADLES" ON WHEELS, AND TRANSPORTED AT PLEASURE.

So, instead of running into pigs, the entire stream is conducted to a spout at the side of the shed, and the spout hangs over a great, brick-lined, iron tank called a ladle. This ladle is on a car, and there are five of them in a train. As one ladle fills, the stream is switched to fall into another, and so, until the whole hundred tons has been emptied into the five ladles. Then the furnace-hole is stopped again, the workmen using a monstrous steam ram called a "gun" to drive the clay home solidly. The blast is turned on again, the ore and fuel continue to pour into the furnace, and four hours later another hundred tons is ready. This goes on day and night without interruption for perhaps six years (unless the furnace loses patience and "breaks out" before then). The capacity of the Duquesne furnaces is 800,000 gross tons annually. And they are but one plant of four such operated by the Carnegie Company. The total capacity of all the Carnegie blast furnaces is 2,700,000 tons a year; yet, driven to their best, they cannot, at this writing, supply their product fast enough to meet the requirements of the business.

Meanwhile the train of ladles has moved away. We can follow it at leisure. What else is there to see hereabout? Here's the boiler-house, the furnaces thereunder burning more of the gas from the blast furnace. Here, pumping engines that supply the air blast. Colossal things they are; stately, lofty, leisurely, ponderous. They force through the stoves and furnaces 50,000 cubic feet of air a minute, at a pressure of 20 pounds. Here are the pumping engines for the water-jacketing. You are astonished to find that these four furnaces need a pumping plant larger than many good-sized cities. Thirty million gallons of water a day they use.

The train of ladles which we saw leave the furnaces is disappearing into another gloomy shed. A portion of the train is switched off here, and three of the cars

with their load of liquid iron pass on down the river on a track that runs along the bank and connects the different Carnegie works. No fear of their cooling in transit. Such a heat as they possess will not dissipate in a hurry.

Two ladles stop here before a "mixer." A mixer is a Brobdignagian kettle of plate iron, and this holds 200 tons. The ladles are lifted from the car one at a time, and their contents poured into the mixer. What if the fifty tons of liquid fire should prove too much for the crane that elevates it? What if the ponderous ladle should overturn or fall? It has happened.

But they go safely now, and the mixer is nearly full. The purpose of the mixer is to render the iron uniform in quality by combining in one frightful broth the different "casts" of the furnaces. These vary slightly in chemical details, but the mixer makes one quality of the whole.

From the mixer is poured, at short intervals, forty tons of the still fluid iron into other ladles which travel to the Bessemer converters.

The Bessemer converters make steel out of iron. Iron, as such, has a comparatively limited use in these days. Bessemer's invention has made steel so cheap that it has driven iron from the field almost everywhere. "Building iron" is not iron; it is steel. There are no more "ironclads," nor even iron ships, except old ones. There are no more iron rails. It is steel, steel, steel, for every purpose where rigidity, elasticity, and toughness are required.

The difference between iron and steel is a matter for the chemists; but, roughly speaking, it lies in the addition of carbon and some other essentials to pure iron. Iron is soft and ductile. Steel is tough and elastic. It is the difference between a hair-pin and a needle.

The iron as it comes from the furnace has not wholly been freed from the impurities with which it was associated underground. Not even the chastening heat of the blast has done that. It still has earthy matters and phosphorus and silicon and manganese and other things in it which are not wanted at all, or if wanted, are desired in a different proportion. Also it has picked up much carbon from the coke. The Bessemer converter frees the iron of almost every trace of these, and such of them as are needed to make steel are then put back once more in the proper proportions.

The operation of the converter is simplicity itself in theory and indescribable in practice. Printed words will give but the bare bones of a scene which is beyond description, beyond the painter, even further —beyond photography.

You stand upon a gaunt platform in the centre of an immense shed that is murky beyond the telling, and crowded with vast machines, strange shapes, and men. Opposite you are the two converters. They look like enormous iron eggs, swung from their centres like tilting ice-pitchers. Between them is a great crane that swings an iron bucket at the end of its arm. The bucket would hold a couple of roll-top desks without difficulty. Between you and this combination of machines is a little railroad track. A train comes over it and stops before you. The train is of small flat cars, each carrying one oblong, upright, iron box, about six feet high and two feet on a side.

Along the further side of the shed rolls another car, carrying a ladle which has just been filled from the mixer. It approaches one of the converters, which, without visible cause, groans itself ponderously to the horizontal. Into the presented mouth the ladle empties the metal. The converter swings back to the perpendicular, and then there shoots from its elevated nose such a blinding burst of glare and flame and flying sparks, accompanied by such a furious roar, that eyes and ears alike are blasted to uselessness for the time. But other eyes are watching. At your elbow stands a calm young man in rough clothes, with all that appearance of silent watchfulness that impresses you throughout the whole of these works. He handles certain levers. The flame, which was at first tinged with a rosy red, burns whiter and fiercer, and finally with the blue-white brilliancy of

an electric arc. The young man touches a lever. The flame dies; the great egg lowers itself to the horizontal. Great clouds of mahogany-hued smoke gush forth. The crane swings the iron bucket under the drooping mouth, and the liquid metal pours out. It is steel now.

What has happened is this: through the liquid iron in the converter has been forced a tremendous blast of air. There is now no coke to burn, as in the furnace, but the air comes so fast and the heat is so intense that everything combustible in the liquid oxidizes. Away goes the carbon in a gush of gas, and the heat of its combustion raises the fierce temperature still higher. The silicon and manganese and all the other impurities burn away, and are either blown off in gas and smoke and sparks, or form a scum of slag which is easily separated from the nearly pure iron that remains.

The calm young man at the levers controls the whole operation. His practised eye is fixed on the living flame that roars from the converter during the blast, and when that flame reaches *the proper color*, a touch of a few levers controlling a complicated hydraulic system tilts down the converter, shuts off the blast, swings the bucket into position, and pours off the liquid. At the right time another man had added a few shovelfuls of "ferro-manganese," which is obtained from manganese ore found largely in Cuba, in Chile, and in the Black Sea region. It is very rich in manganese and carbon, and its addition gives to the pure, soft iron just the proportion of toughness and hardness desired.

The Bessemer converter was a wonderfully beneficial invention for mankind, and the inventor deserved all the rewards he received. But of late, another process—*the open hearth*—is pushing it hard. Both have the same end in view, to make steel from iron, but they get at it in different ways. In the Bessemer process, as stated, *all* the carbon is burned away first, and then the right proportion is put back again. In the open-hearth process the carbon is burned away until only the right proportion remains. In this process no blast is used, but the surface of the molten metal is subjected to the direct action of a gas flame, made unimaginably hot by the accumulation of its own heat. It is necessary that the temperature of this flame be accurately controlled, and the man who determines this is one of the highest-paid employees in the works. He decides between temperatures in the thousands of degrees merely by watching the flame through blue spectacles.

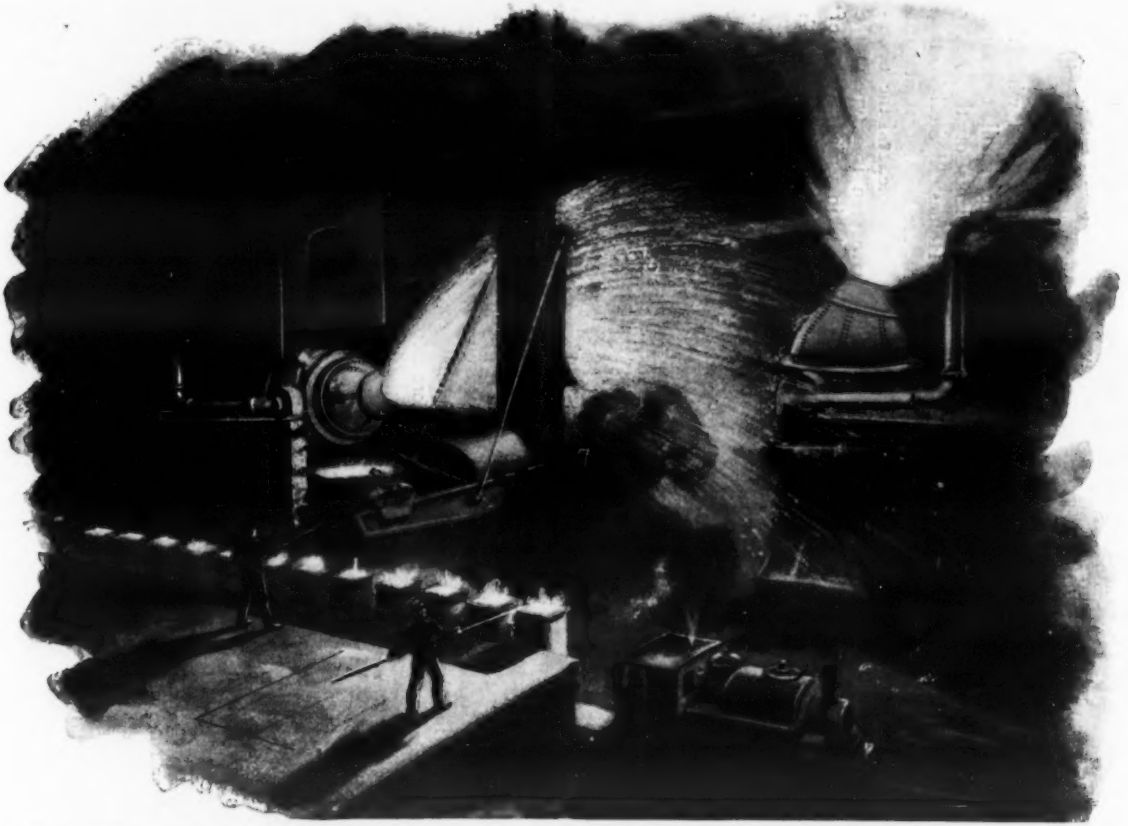
The open-hearth process is somewhat slower than the Bessemer, but is capable of more accurate control. The steel it produces is slightly more elastic and tougher than the Bessemer, though not so hard nor rigid. It is used in the making of bridges, boiler plates, armor plates, and for other purposes where it is subjected to sudden shocks and shifting weights. The Bessemer is generally preferred for rails, beams, and purposes where rigidity and hardness are desired.

The Carnegie Steel Works use both processes, of course, having an annual capacity of 1,650,000 tons of open-hearth steel and 1,600,000 tons of Bessemer steel.

But it is the Bessemer process before our eyes now, and the converter has poured its forty tons of steel into the bucket on the crane.

Now the crane swings its bucket over the first of the upright boxes on the cars. Forty feet away and fifteen feet above, you can distinctly feel the heat of its contents, yet an imperturbable Shadrach steps up to it, taps its bottom with a bar, and a small stream of the contents falls into the box. This box is a mould. When it is full it and its car are moved along and another mould takes its place, and so until the bucket is empty.

You need not move from your perch to see the rest of the operation if you can accustom yourself to the crash and roar and flare of the converters. A strenuous little engine puffs away with the train of moulds. One by one they pass under a "stripper," a hydraulic ram, which pushes the mould off the now partly cooled steel. There comes forth a solid block, weighing one and a half tons, in the shape of the inside



THE BESSEMER CONVERTERS AT DUQUESNE. EACH IN TURN EMPTIES ITS CONTENTS INTO THE SWINGING BUCKET, FROM WHICH THE LIQUID STEEL IS DRAWN OFF INTO INGOT-MOULDS.

of the mould. It is bright-red-hot, but evidently cooling fast. This is an "ingot" of steel ready for rolling, except that it isn't hot enough. So it goes into a "soaking pit," where it bathes for a while in flame, then, nearly white-hot again, but still in its shape, it comes forth to be rolled.

The machinery which handles it is perhaps as interesting to the unscientific observer as anything else about the works. The ingot is lifted, swung, carried, transferred from place to place at a pace faster than a man could run, with little or no human interference. Finally it reaches the first series of rolls.

Imagine a clothes-wringer with three rolls instead of two, one above another. Their surfaces, instead of being flat and smooth, as in the case of a wringer, are grooved in different shapes and sizes. Top and bottom rolls turn in the same direction, the middle roll in the opposite direction, so that where the rolls impinge on each other there is a "bite" that will seize and drag through anything presented to it.

The ingot, moved by a series of rollers which pass the hot block along like the traditional "thing of life," presents its end accurately to the first groove. This groove may, for the sake of explanation, be likened to a rough capital I, lying on its side like this ⊢, one-half the shape being on the middle roll, the other half on the lower roll. In size it is a little smaller than the size of the ingot. The ingot is gripped, dragged through, and the "squeeze" lengthens it considerably, besides giving it an approximate shape. It is lifted (always by automatic machinery) and again presented to a smaller groove in the upper side of the middle roll, where the upper roll gets a bite on it. It goes back longer, slimmer, more shaped. And so, back and forth, through groove after groove, and series after series, tested here and there, clipped and cut and pruned at intervals, but always travelling and always getting thinner and longer. Finally it shoots along a last slide, is weighed automatically, cooled automatically, slid neatly into a pile of its fellows, and automatically moved away to a storage yard for shipment —a finished building beam. It has developed from a white-hot ingot in half the time it has taken you to read this article; has travelled close to half a mile, and gone through perhaps a dozen machines without being touched by hands.

All this at Duquesne; and while the Duquesne works are but small, compared with the gigantic plants of the Edgar Thompson and Homestead Steel Works, and they, in turn, are but important parts of a hugely larger whole, still the operation that we have seen is a type of the operations by which, in various forms of bars and beams and plates and billets, the Carnegie Steel Company produces 3,250,000 tons of finished steel each year. And this will not be sufficient to enable the company to keep pace with its orders this year. The output in 1898 of this one concern was nearly one-half that of all Great Britain's, and more than one-third of all Germany's. It was almost exactly one-fourth of the entire steel production of the United States; was one-half more than all France produced, and nearly ten per cent. of the whole world's production. Yet new furnaces, new mills, new plants are being erected; more land is being taken; more men are being hired, and, in the words of the founder, "The Carnegie Steel Company has just begun to grow."

Perhaps an appreciation of the immense industrial importance of this concern can be gathered from the statement that it has, directly and indirectly, more men on its payroll than were enrolled in the United States regular army prior to 1897, and that it is the largest employer of labor, skilled and otherwise, in the United States, with the possible exception of the Pennsylvania Railroad Company.

And another fact concerning it has just made its appearance in the newspapers owing to certain litigation between members of its organization; that is, that this year's *profits* of this concern will be $42,000,000.

That's a good rich fact to stop with.

HOW A SHIP FINDS HER WAY AT SEA

BEING NO 4 OF "SIMPLE EXPLANATIONS"

By George Hough

The series of "Simple Explanations" of the scientific principles involved in matters of every-day interest began in the December number with "Wireless Telegraphy." In February, "How a Trolley-Car Runs." In March, "A Glimpse of the Germ World." Next month, "The Telephone."

OF all the animals, man is the easiest *lost*. He has little or no instinct of direction and locality. That strange sixth sense that enables dogs and birds to find their way across unfamiliar country has never been given to man, or, if it were ever possessed by him, it has gone from him even as his sense of smell is now going.

From the earliest man has blazed himself paths, and pinned his localities together with landmarks. He is essentially a creature of *visible* guides. In the dark you can lose him in his own room.

However, he got along pretty well on the land, and on the sea also, as long as his voyages were merely dashes from headland to headland. It was when he ventured beyond the horizon that he recognized his insufficiencies. It was when he desired to reach lands that were not in sight from other lands that he found himself inferior to the birds and the fish, and set himself to the problems of navigation.

Nothing is more hopelessly *guideless* than the surface of the open sea. Nor thickest forest nor widest prairie nor blackest cavern presents such difficulties to him who would follow a straight line across it. The sea, with all the bewildering monotony of the others, adds to that danger a treacherous life of its own. The very substance of it moves in currents invisible, unmeasurable, often unguessed; shifting with every wind, certain in nothing but their uncertainties; resistless, remorseless, deadly. So a ship may be bravely sailing a quiet sea with her compass showing her course to be an undeviating east, yet all the time be in the grip of a current that is carrying her bodily *sidewise* to the northward also, straight to a reef that her captain expects to miss by miles.

To insure safety, therefore, some method of definite guidance by definite marks in known positions is necessary. Near the land these marks are plentiful in light-houses, light-ships, prominent headlands, buoys, and such like. In thick weather the captain can check his reckoning quite accurately by sounding the depth of water under him. But what shall he do in the open sea? In all the trackless

waste, what is there that is fixed and definite?

The answer has been known ever since men went down to the sea in ships; there are the sun, the moon, and the stars, whose positions and movements have been known more or less with accuracy for centuries. And for centuries have men been studying out the method of applying these known movements to the solution of the problems of navigation. In fact, navigation is probably one of the very oldest studies of civilization. It has gone hand in hand with the study of the stars.

There are two phases to the question. The first is: How shall the position of the ship be found, and when found how *located?* The other is: What course shall be steered that will make the shortest and safest line to the destination?

The matter of the location should be explained first, because it includes the use of the words "latitude" and "longitude," which must be repeated frequently hereafter.

You see it is necessary to get at some definite *marking* of a position in mid-ocean, and mid-ocean has no marks on it. Even though a navigator knew exactly how far his ship had sailed from a certain point and in what direction, how could he describe the locality briefly and accurately to another? Suppose you said to a friend: "I walked up Broadway, New York City, from the Battery, three miles, two rods, and one yard, and there I fell over a loose flagstone; be careful of that flagstone when you pass it," of what real benefit would the warning be to your friend? But if you said: "Look out, there's a dangerous spot on the southwest corner of Broadway and Forty-second Street," that location *means* something.

By using the terms "latitude" and "longitude" a sailor fixes places as definitely as you could by using the intersection of streets, *and in about the same manner*. It seems worth while to go into this matter briefly for the sake of clearness farther on.

One Hipparchus, a Greek, who thought the world was flat and that the sun revolved around it, and who lived centuries before Christ, devised this plan of marking localities. He divided up the surface of his funny, flat little world into small squares by drawing equidistant lines from top to bottom and from side to side of his map. These lines being numbered, it was easy to fix any locality by *mentioning the two lines that crossed each other at the spot*. Twenty-one hundred years of study have developed no better method of determining geographical localities than this, and while the map of the world has undergone wonderful changes in that time, geographers have always retained these lines. We know them now as the "parallels" of latitude and the "meridians" of longitude.

Latitude is distance north or south of the equator. The equator is latitude 0. Longitude is distance east or west of any meridian that may be determined upon as a place to begin counting, generally that meridian that passes through the Royal Observatory at Greenwich, England, because that observatory was founded by Charles II. for the purpose of determining astronomical data for the use of navigators.

A line drawn around a globe is necessarily a circle, and a circle has 360 "degrees." Consequently there are 360 degrees of both longitude and latitude—that is, if a man could walk around the globe on the equator he would cross 360 meridians of longitude, one degree apart, and, the circumference of the earth being about 25,000 miles at the equator, each degree would be a trifle over sixty-nine land miles from the next. Considering the earth as a perfect sphere, there would be the same distance between each degree line of latitude. Suppose this man to begin his damp and tempestuous walk at that spot where the Greenwich meridian crossed the equator, he would begin at latitude 0, longitude 0, which is a spot in the Gulf of Guinea. For every sixty-nine miles he walked to the westward he would change his longitude one degree; at the end of the second sixty-nine miles, for example, he would be in latitude 0, longitude 2 west. Exactly half-way around the earth he would be at longitude 180. As the longitude is

counted *both* ways, east and west, from nothing to 180, this is the highest number he would reach, the count from that point decreasing with every sixty-nine miles, and being counted east instead of west; thus the next degree would be 179 east longitude, the next 178 east, and so on to longitude 0 again at the point of starting. Similarly, if he walked from the equator due north, his latitude would increase with (about) every sixty-nine miles, one degree. The highest latitude he could reach would be 90 degrees north at the North Pole, because from the equator to the pole is only a quarter of the full circle. The goal of all Arctic explorers is, therefore, 90 degrees north latitude.

Fractions of degrees are measured in "minutes" and "seconds." Don't confuse them with the minutes and seconds of time; these represent *distance*. A minute is one-sixtieth of a degree, and a second one-sixtieth of a minute. A degree at the equator being about sixty-nine land miles,* a minute would be about a mile and one-seventh, and a second about one hundred feet.

You can, therefore, see that *there is no spot on the surface of the earth that cannot be located to within one hundred feet* at most, by the intersection of two imaginary lines numbered in degrees, minutes, and seconds from some defined starting-point. We call these lines "imaginary," and so they are, as a matter of strict truth, for the surface of the earth doesn't show them to the eye. But they are marked on all maps and charts in the plainest way, and to the sailor's mind they are as definite and actual as any street-line may be to you.

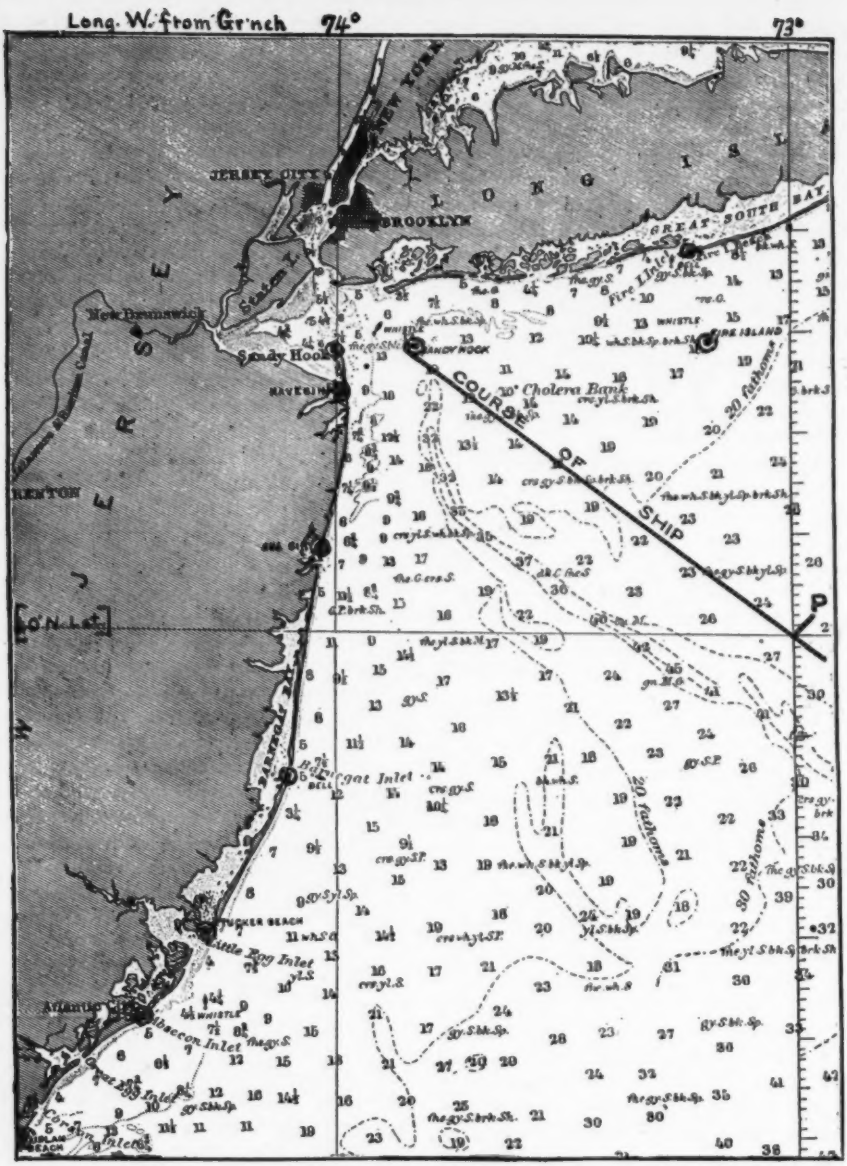
I hope thus far to have made it plain just how a locality may be fixed, even though it be in mid-ocean. But that is only a small part of the problem. Of what use to the navigator to know that he was in *some* definite latitude and longitude if he didn't know what it was? We approach now the task of explaining how he can, with assurance, put the point of his pencil on exactly that spot on his chart that represents the position of his ship at the moment.

It should be said at the beginning that the chart is an essential to all navigation. A government chart is a remarkable piece of work, in many respects undoubtedly the most scientifically and carefully prepared drawing ever put on paper. It shows in picture-language exactly the things that the sailor wishes to know, so far as they can be told at all. It shows the configuration of the coast, the position of all dangers, the depth of water, the character of the bottom, the location of lights and buoys, and, especially, exact distances and directions by compass. If a sailor knows where he is on the chart, it is easy to see in just what direction he must steer to arrive at his destination, and just what dangers he must avoid on the way.

A small section of a chart is shown on another page, representing the coastwise waters from Sandy Hook to the Delaware Capes. Two very important details of this chart are not shown in the illustration for lack of room. One of these is the *scale*, by which distances can be accurately measured; the other is the compass diagram, which on an entire chart shows the compass directions—the "bearings," as the sailor calls them.

The compass is, of course, the most important item in the navigator's outfit. It is to be supposed that every one knows what a compass is; that it is, in simplest form, a magnetized steel needle, delicately pivoted at its centre, the ends of which, if it is free to swing, will point *approximately* north and south. Notice that "approximately." It may be news to many readers that there are only a very few places on the globe where the compass points directly to the North Pole. In the latitude of the United States, the needle points considerably to the *west* of the true north, and this "variation," as it is called, changes mate-

* A degree of longitude at the equator is exactly sixty *nautical* miles, and a minute, therefore, exactly one nautical mile, commonly called a "knot." Distances at sea are always measured in knots, or nautical miles. A knot, as stated, is near enough to one and one-seventh miles to call it so for the purposes of rough and ready comparison. A torpedo-boat having a speed of thirty-five knots an hour would, therefore, keep abreast of an express train making forty *miles* an hour.



A small section of a large Government chart, showing the coast of New Jersey. The two straight perpendicular lines are the meridians of 74° and 73° West Longitude. The horizontal line is the 40th parallel of North Latitude. The small, thickly sprinkled figures show the depth of water at low tide, in fathoms. (A fathom is six feet.) The abbreviations in small italic type here and there among these soundings show the character of the bottom. Thus, "crs. gy. S. bk. Sp. brk. Sh." means "bottom is of coarse gray sand with black specks and broken shells." The sounding lead brings up a sample of the bottom, and the chart thus assists the sailor in fixing his position in thick weather. Light-ships and light-houses are shown above, enclosed in a small circle. On the chart they are generally colored red or yellow. Scale of miles and compass diagram not shown. The line marked "course of ship" is added hereon for illustrative purposes.

rially with material changes of the ship's position, and even at the same spot is not the same every year. This variation must be allowed for when the skipper makes his course.

A compass, anyway, is an uncertain and delicate contrivance. Theoretically, all the compasses on earth point to the same spot. Practically, no two compasses point alike on shipboard, for each has certain local influences that tend to make it "deviate," as it is called, from the common point. Masses of iron, chains, wire rope, even an awning post, near the compass affect its pointing, and affect it differently in every position of the ship's head. In iron ships, which are themselves magnets, huge but weak, the compass is marvellously erratic. All these whims and faults must be studied out, corrected as far as possible, and when uncorrected allowed for.

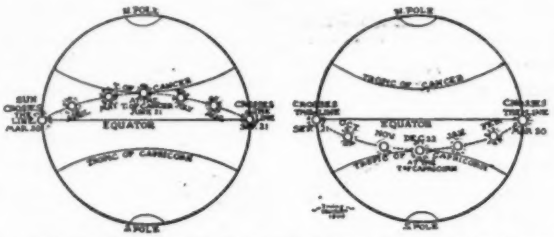


Diagram illustrating the "declination" of the sun; that is, its distance from the equator throughout the year. The navigator finds his latitude by finding with a sextant his distance from the sun, and adding to or subtracting from that the known distance of the sun north or south of the equator on that day and hour.

But with a compass fully understood, the ship's head can be kept very near a straight line in any desired direction.

Now suppose that a ship sailed from New York harbor, and at two o'clock in the afternoon passed close to the Sandy Hook light-ship. (See chart.) The course is, say, southeast, and the ship is making ten knots an hour. At five o'clock, therefore, she has gone thirty knots, and *if she has kept to a rigidly straight line*, the captain can mark a line on his chart from the light-ship to the southeast, measure off thirty miles on it, and be reasonably certain that he is at P. This is "dead reckoning"—that is, finding one's position by measuring the distance and direction sailed from a previous position.

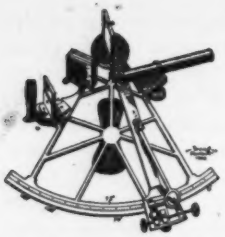
But this method of "dead reckoning," while well enough for coastwise voyaging, where known marks are frequently seen, is prolific of error. Mistakes are continuous and cumulative. The mistake of one day is carried to the next, and unless there is a frequent method of "checking" the position, the best captain is likely to be uncertain of his exact location after a day or two.

By little and little, as astronomers figured the movements of heavenly bodies more accurately, and as instrument makers improved the reliability of their appliances, the mariner used, more and more, the *observation* method—that is, the determination of his position by figuring it from the known position of the sun, moon, or a star. He very early learned to find his latitude by this method, but it was a long time before he could fix his longitude as well.

First, as to getting the latitude. Latitude, you remember, is simply one's distance from the equator, measured in degrees, minutes, and seconds.

Suppose the sun were always immediately over the equator, and that you were given some method of measuring your distance north or south of the sun. There would be your latitude fixed at once, and the actual practice is quite as simple in theory, although there are many allowances and corrections to be made.

You know, of course, that the sun is actually "over the equator" on only two days in each year; the equinoctial days, March 20th and September 21st. It moves (it is easier explained if we go back to the belief of Hipparchus, and consider the sun as moving and the earth immovable) from a point about 23½ degrees south of the equator to a point 23½ degrees north of the equator. On the 21st or 22d of December it is at its southern point and starts northward. March 20th it crosses



A sextant: the instrument with which the navigator can measure angles, and, therefore, distances. (See following diagrams.)

the equator, June 21st it reaches its most northern point, and starts on its southern trip. September 21st it crosses the equator "bound south," and on December 21st it begins all over again.

Consequently the sun has a different position as regards the equator for every day in the year, and every hour in the day, for that matter. This position is very carefully figured out for every day and hour by the national astronomers, and printed in a "Nautical Almanac" with which every ship captain is supplied. The position of the sun as regards the equator is called the "declination." Declination 23 degrees north, for example, means that the sun is 23 degrees north of the equator on that particular day and time.

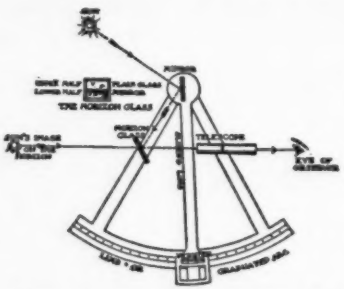
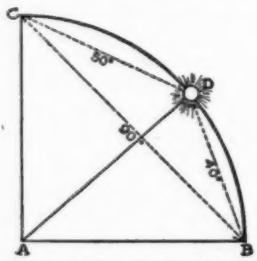


Diagram illustrating principle of sextant. With the sliding limb at zero on the scale, the mirror is exactly parallel with the horizon glass. The telescope is kept fixed on the horizon line, and the sliding limb moved over the scale until the mirror at its end is inclined sufficiently to throw the sun's image on to the mirrored half of the horizon glass. In this position the scale will show the arc of the angle DAB in the following diagram, or the sun's height above horizon in degrees, minutes, and seconds.

Now, if you know how far the sun is north of the equator and know also how far you are north of the sun, the latitude is found as easily as adding two and two. The navigator knows from his almanac where the sun is as regards the equator. He finds where he is as regards the sun by means of an instrument called a sextant.

Just before twelve o'clock he takes his stand on deck, faces the sun, and squints through the telescope of his sextant at the horizon. He sees the horizon as a perfectly distinct line through one-half of a little square of glass, as shown in the cut. The other half of this glass is silvered; is a mirror. There is another mirror on the instrument at the end of a swinging arm, and the second mirror reflects the image of the sun. Now the captain moves the arm slowly until the second mirror is tipped just enough to throw the reflection of the sun into the first mirror. Dark glasses shield the eyes from the glare, and the captain can see two things—the horizon through the plain glass, and the image of the sun in the mirrored half. He brings that image down by gently moving the arm until the lower edge of it just touches the line of the horizon. For a few moments before noon, as the sun continues to rise in the heavens, the motion of the swinging arm continues gently to keep the image in place, just "kissing" the horizon line. Finally the upward movement of the sun ceases, there is a slight period of apparent rest, and then it begins to descend toward the west. At that instant the captain says "Eight bells," which means twelve o'clock noon. It is always noon, as you know, when the sun is at its highest point.

The captain has now found two things. He has found the exact second of noon for his locality, and *the index of his sextant tells him just how many degrees above the horizon the sun was* at that second. The diagram will make this plain. The captain is at A, the sun is at D, the horizon is at B. C is the zenith—the spot in the heavens which is directly overhead. The angle CAB is a right angle, therefore the arc CB is a quarter circle of 90 degrees. We will suppose that the



The navigator is at A, the horizon at B, the sun at D. C is the zenith—the spot exactly overhead. The angle CAB is a right angle, and its arc therefore is 90°. The sextant showing the sun to be 40° above the horizon, it follows that C must be 50° from the sun.

captain's sextant shows that the arc from sun to horizon—from D to B—is 40 degrees. Then the distance from sun to zenith must be the difference between 40 and 90, which is 50 degrees.

Consequently the captain has found the distance of the sun from a spot directly overhead him; in other words, he has found *his* distance from the sun to be 50 degrees. Suppose his almanac tells him that the sun that day was directly over the equator. Then he is 50 degrees from the equator, or in latitude 50. Suppose that the almanac said that the sun was ten degrees *south* of the equator. The captain, knowing himself to be somewhere to the north of it, must subtract that ten degrees from his fifty degrees from the sun, to get his distance from the equator. That would put him somewhere on the fortieth parallel of latitude. This parallel, as you can see on the chart, passes through New Jersey, just south of Sea Girt. But it goes all the way around the world, and, so far as the latitude is concerned, our captain might be anywhere on it. He must, therefore, find next *where* on that parallel he is; in other words, he must get his longitude also—and this, if he chooses, he can find from the same sextant-sight, by means of his chronometer.

A chronometer is a very finely made and adjusted clock. One Harrison, by inventing a clock that would keep accurate time in all temperatures and under all circumstances, received in 1773 a reward of $100,000 offered in the reign of Queen Anne for the best method of finding a ship's longitude. The method is simplicity itself, in theory, and theories are all we are after now.

You know, of course, that the earth revolves on its axis once in each twenty-four hours. As the earth turns from west to east, and the meridians of longitude run north and south, you can see that the 360 degree lines of longitude pass under the sun, one after the other, in twenty-four hours. And that means that a new degree passes every four minutes.

Now, it is noon at any place on the earth when the sun is at the highest point in the heavens at that place. That is, it is noon at any place *when the meridian which passes through that place is directly under the sun*. Consequently, as it takes four minutes for the sun to pass through one degree, difference of longitude becomes merely a difference of *time*.

Now, the captain's chronometer is kept running with the most anxious exactitude to the time of Greenwich, England, which, you remember, is longitude 0. When the captain finds the noon for his locality (by noting when the sun is at its highest point, as explained), he has but to compare his time with the Greenwich time, and figure four minutes to each degree. So, in the case we have before us, at the moment the captain made "eight bells"—noon—some one, stationed for the purpose at the chronometer, marked the exact chronometer time. Suppose that was 4.52 P.M. That is four hours and fifty-two minutes *after* noon. That is 292 minutes after noon. Counting four minutes of time to each degree of longitude, he would be 73 degrees of longitude to the west of Greenwich. The captain knows, therefore, with certainty, that his ship at noon was at that exact spot on the chart where the 73d meridian of west longitude crosses the 40th parallel of north latitude, because he is on both at once, and can be nowhere except at their intersection. This spot is perfectly defined on the chart, as you can see. If his position happened to come in odd minutes instead of even degrees, he could find the place with a little measuring.

The above gives the theory and the actual practice in its simplest form. The real operation of "working out a sight" is not so easy as it reads above, for there are many allowances and conditions to understand and figure out.

But with experience, skill, care, and knowledge, and with a sky that will allow him frequent sights at the sun or the stars (for the stars are also used), a captain can take his steamer across the ocean as accurately as you can steer a bicycle across a park, and he can keep in the centre of a narrow "steamship lane" as exactly as you can keep your wheel to the centre of the gravelled walk.

AN INSECT CARNIVAL.

PICTURE PARAGRAPHS.

[*We shall be glad to consider photographs of all kinds suitable for this section of the magazine, and to pay for such as are accepted.*—ED.]

AN INSECT CARNIVAL.

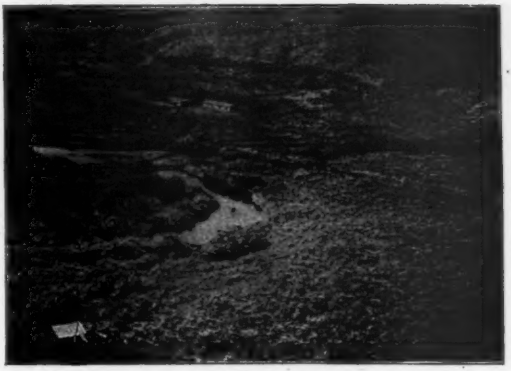
"While taking a stroll through the fields some days ago" (writes a correspondent), "I noticed a small tree stump, the top of which presented a most singular appearance. It was covered with airy feathers slowly moving to and fro, and apparently without a cause. But when I examined more closely I found beneath each feather a tiny ant. Undoubtedly the thrifty insects ultimately found some practical use for the pretty feathers, but for the moment they were using them as playthings, holding high carnival, circling round the stump, crossing and recrossing, stopping sometimes to salute each other, but always waving aloft their precious banners. I have often spent hours watching the movements of these industrious insects, but this is the first time that I have ever discovered them at play."

ICE-BOATS ON THE YUKON RIVER.

Our photograph shows how gold prospectors in the Klondike region lighten the labor of transporting their outfits by rigging up temporary masts and sails on their sledges, the wind usually being strong enough to make a high rate of travel possible. On the ice-boat to the left of the illustration the owner is seated before the mast.

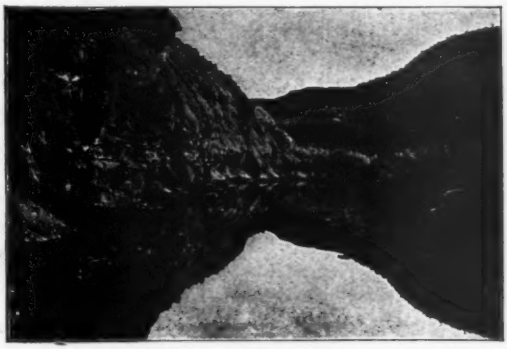
ICE-BOATS ON THE YUKON RIVER.

RIVERS OF OIL.



RIVERS OF OIL.

The petroleum oil wells of Wyoming are chief among the commercial possibilities of a virgin State. Perhaps the best known of the fields is that called locally the Popo Agie. The surface of the central portion of the oil field is very rough and broken, and is cut into deep gulches with precipitous hillsides. This district is at present over one hundred miles from any railroad. The history of this field is far more interesting than that of any other oil field in Wyoming, since it was at this spot that Bonneville discovered oil in 1833, and it is the place where the first producing oil well was drilled. From the date of Bonneville's visit up to 1867 the oil spring was unknown, except to the hunter and trapper who frequented the locality to secure the oil for medicinal purposes.



A PETROLEUM LAKE.

For years past the wells have remained untouched. The oil that has flowed from the wells through leaks has formed itself into rivers, and has been used by the ranchers for miles about for lubricating purposes, and to some extent by the gold mines and the flour mill for steam making. The distance to a shipping point is so great that a pipe line is out of the question, and these fields, saturated with valuable oil, must remain useless until a railroad shall have been built to within a reasonable distance.

A PETROLEUM LAKE.

In the district referred to in the previous paragraph may be found a lake of crude oil, the product of years of seepage from the fields lying above and beyond. Petroleum has here gathered in immeasurable quantity into what was once a tiny valley with its scanty plant life. This lake holds a fortune for the man who can devise a method of marketing the product.

ESQUIMAUX SPECTACLES.

SNOW SPECTACLES.

We publish an interesting photograph showing the queer spectacles worn by the better classes of Esquimaux within the Arctic circle. These spectacles are made of wood. Two bits of cedar are taken by the Esquimau and cut into a form resembling the bowls of two large wooden spoons. Along the length of the outer sides of the two spoon-like pieces of wood is left a sort of ridge, and directly beneath it a very small slit is cut completely through the bowls. This slit is only the thickness of a piece of wrapping paper, yet when the spectacles have been adjusted to the native's eyes, they fit so snugly that he can see perfectly through the opening. The object of this odd contrivance is to save the eyes from the glare. Up in that country the sunlight lasts for six months at a time, and the snow is such a strong reflector of the sun's rays that a person who is out of doors a great deal would soon become more or less blind unless he were provided with a pair of these wooden spectacles.

HOW SHIPS' MASTS ARE SENT TO THE DOCKYARDS.

MOVING MONSTER MASTS.

The business of supplying wooden masts for sailing-ships and yachts is still a thriving one, in spite of the increasing use of steel for this purpose. The masts are shipped in great loads that tax the resources of the railroads. The accompanying photograph shows the masts at the timber landing, to which they are floated from the mountain forests where they are cut, and from this point they are sent by train to the various shipyards. The logs are from 70 to 101 feet long, and the longest weighs 24,000 pounds. Two and sometimes three railroad trucks are required to transport these enormous lengths of timber.

A WONDER OF IRRIGATION.

In conducting water from a river to thirsty Wyoming fields it is necessary to maintain a gradual lowering of the elevation. This fact calls for the cutting of trenches in places, and occasionally for the erection of lofty flumes through which the water may rush to its destination. The water runs within a box, which is covered to reduce the loss through evaporation. The flume stands upon trestle-work built across valleys and more abrupt depressions. The height of this trestle-work varies up to one hundred feet. It is an expensive method of securing water for irrigation, and the loss of water through leakage in the course of several miles of such a flume amounts to a considerable percentage of the initial volume.

AN ICE-PLOUGH.

We give here an illustration of a new ice-harvesting machine built for use on the Hudson River. The implement is mounted on slides and is drawn over the ice by horse-power. The sharp teeth of the wheel in front grip into the ice, and as the wheel revolves it puts into motion the circular saw at the rear, which cuts the ice to the required depth. In front of the saw is a steel blade which, as it is drawn along,

forms a passage-way in which the saw can revolve.

A WONDER OF IRRIGATION.

To use the ice-plough to most advantage, the operator first picks out a large sheet of clear ice, across which a long groove not more than an inch deep is dug by hand utensils. One slide of the plough is placed in this groove—which is made to guide the plough—and then the implement is drawn along this groove from one end of the sheet of ice to the other, making a long hole completely through the ice. The operator next uses the resulting deep groove for a guide, and setting the saw about two feet away, the plough is again dragged completely across the sheet of ice, thus carving out a hunk of ice about two feet wide, about as much thick, but 100 or even 200 feet long. This long piece has only to be cut into four-feet sections by hand saws, when the ice is ready for shipment or storage.

Up to a few years ago all the natural ice we used—ice not made artificially in summer time—had to be cut by hand saws, and as it takes nearly as long to saw a piece of ice as it does to saw a piece of lumber of the same size, the enormous saving of time effected by the new invention is obvious.

AN ICE-PLOUGH.

300 YARDS ON THE WINGS OF A CYCLONE.

The recent cyclone at Herman, Nebraska, a village lying forty miles north of Omaha, had its playful side no less truly than its disastrous results. A piano, the one luxury of some home, was carried high in the air a distance of three hundred yards, and deposited feet downward. The front and tail boards lay beside it, torn from their fastenings. A little girl was the first to touch it in its new position, and her ears were greeted by a kitten's piteous mew. Wedged in behind the keyboard was a much disturbed kitten, which had been caught there in some mysterious fashion. The children of the village are still discussing the problem of the kitten's presence in the works of the piano. The town of Herman is now rising from its ruins with that swiftness for which the West is noted, and in a few months not a mark will remain of the blighting hand of a Nebraska cyclone.

300 YARDS ON THE WINGS OF A CYCLONE.

A BEAUTY FACTORY

By Chauncey Montgomery M'Govern.

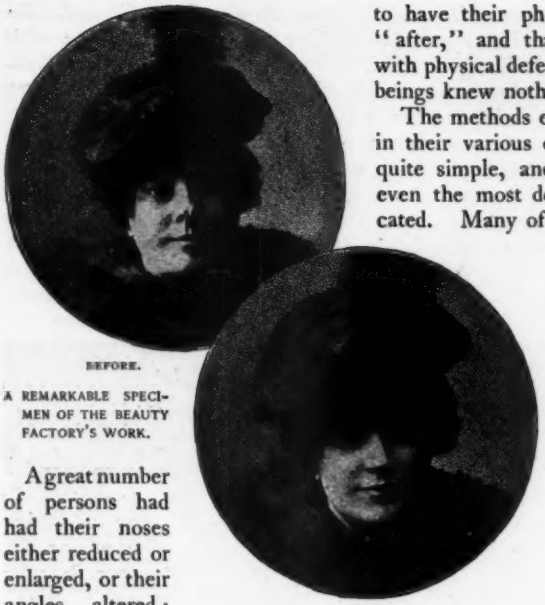
(*Illustrated with Photographs.*)

Yankee business enterprise, having made itself felt in the four quarters of the earth, is now invading the sphere of the gods, and beauty, which since the earliest days has been looked upon by mortal man as the exclusive gift of the propitious Venus, can to-day be purchased at so many dollars per yard. There are already half-a-dozen "beauty factories" throughout the States, where any ugly woman may go, and at a small outlay buy as much loveliness as will cause her to pass muster in a crowd of beauties; and should the person in question be blessed with a bulging pocket-book, she can have herself so completely made over that even her own mother would recognize her only with difficulty.

I spent several hours in one of these beauty factories not many weeks ago. Some people with whom I was acquainted had told me of satisfactory operations they had had performed at the place, so that I was prepared for surprises. But it was nothing short of amazing to see a nimble-fingered surgeon transform a highly arched Roman nose into one of classic lines, to see a clearly formed mustache removed forever from a woman's lip, and to see a double chin made into a single one before the spectator had time to guess what the surgeon was about to try.

The factory I visited is the parent of all the others, yet it is less than ten years old. That it filled a great demand was apparent in the fact that, although six skilled surgeons were constantly at work, there were never less than a score of people awaiting their turns for operations.

One can scarcely think of any defect of the body—caused either by nature, error, or accident—which had not been treated here. I was shown several large albums filled with sets of two photographs, each showing the "before" and "after" of several thousand ugly persons who had been made the reverse by one of the factory's surgeons. Repulsive hunchbacks had been made perfectly smooth, pitiful club feet had been set at correct angles, comically bowed legs had been given a graceful straightness, lamed legs had been made sound; calves, busts, and arms had been either enlarged or reduced; thick lips had been compressed to the average size, while the cases of warts, moles, pimples and other blotches, mustaches, and even whiskers which had been removed—the latter so as never to grow again—were too numerous to reckon.



BEFORE. AFTER.

A REMARKABLE SPECIMEN OF THE BEAUTY FACTORY'S WORK.

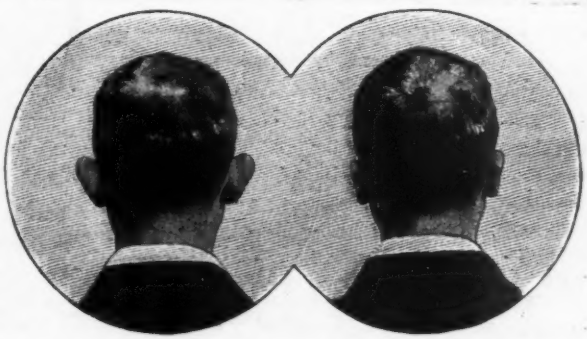
A great number of persons had had their noses either reduced or enlarged, or their angles altered; many had had hare-lips moulded down to the normal form. Nearly one person in every twenty-five had had protruding ears neatly pressed back against the head; several had had their heights increased by from three-quarters of an inch to two inches, while one patient—an Indian who had become a lawyer—had had his prominent cheeks reduced to the level of the average Caucasian.

The superintendent informed me that, in addition to these thousands of photographs, there were proportionately about as many more people who had had wrinkles removed and dimples made in their cheeks and chins, but of whom he had not bothered to have photographs made. He pointed out, also, that, while the photographs he showed me gave a good idea of the various "beautifyings which the factory turned out," many interesting patients would not consent to have their photographs taken "before" and "after," and that among the latter were some with physical defects which the majority of human beings knew nothing about.

The methods employed by the beauty surgeons in their various operations seemed to me to be quite simple, and the apparatus they used for even the most delicate work not at all complicated. Many of the operations are performed in a few seconds without pain to the patient, but in most cases the use of anæsthetics is resorted to.

To show how a dimple is made in a cheek I was admitted to the room where a young woman of nineteen was desirous of being so adorned. The patient did not strike me as needing any dimple to make her worthy of the title of "beautiful," and so I whispered to the surgeon. His reply was that he thought as I did, "but she is so elated over the way I made her naturally large ears small that she wants me to go a step further." By the way, I was allowed by the patient to examine her ears, but I could find no trace of the surgeon's slashings.

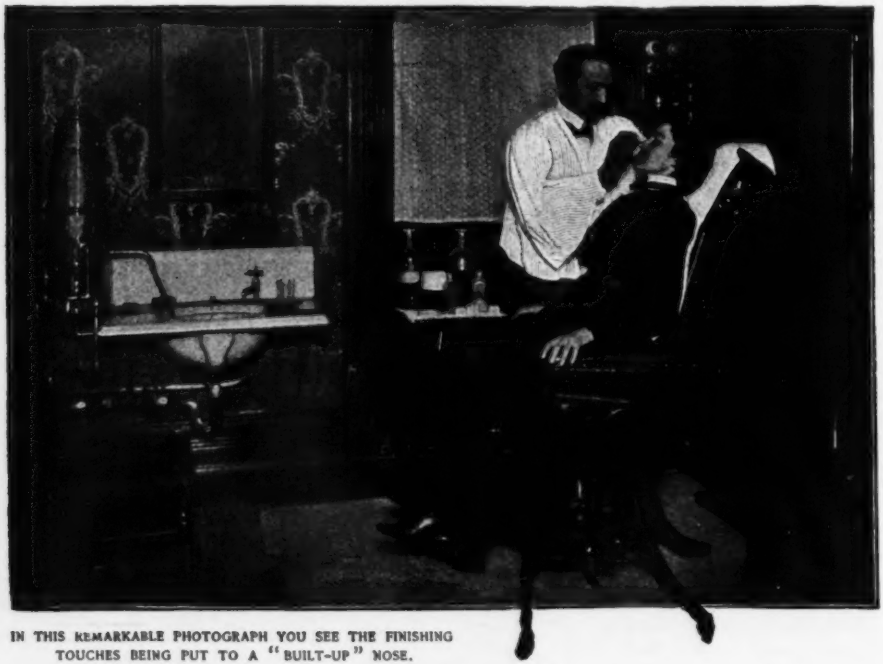
When the chair had been adjusted the surgeon gave the woman a hand-mirror, telling her to look into it and smile her very sweetest. As she was carrying out his orders, the surgeon marked a spot in her cheek, gave her some anæsthetic, and



BEFORE. AFTER.

PROJECTING EARS ARE EFFECTIVELY TRIMMED.

in a few moments she was unconscious. He then took up a small, narrow-bladed knife, and made a short, straight incision through the skin. He folded back the skin on both sides, and then removed a slight elliptical section of the flesh. The assistant next sprayed the wound with an antiseptic—to prevent inflammation, the surgeon remarked—after which the edges of the skin were drawn together and sewed up. I was told that the operation was then completed.



IN THIS REMARKABLE PHOTOGRAPH YOU SEE THE FINISHING TOUCHES BEING PUT TO A "BUILT-UP" NOSE.

"The wound will heal in a few days," said the surgeon, "and at the end of that time the patient will return to me and I will remove the slight scar by electricity. There will then be not the least trace of the knife, and she will have as pretty a dimple as can be found in a day's walk.

"There are other methods I use to make dimples," he continued. "I select my method according to the sort of patient and the size of the dimple desired. Sometimes I insert an electric needle under the skin in order to destroy the tissue with which it comes in contact. In the healing, the lower layer shrinks. This leaves a hollow, and the hollow is a dimple. A much more usual method than this, however, is where the electrical application is made on the inside of the mouth, which thus destroys some of the tissues in the lining of the mouth. After the wound heals there is no possibility of a scar when this method is used, but there is some temporary discomfort to the patient until the wound heals up."

On the day of my visit a man, well known on the American race track—Jockey Lindstrom—was having a high arch removed from his nose. The success of the operation so pleased him that he did not express the least reluctance to having the facts published, and the result certainly seemed to justify the experiment.

When Lindstrom had stepped into the

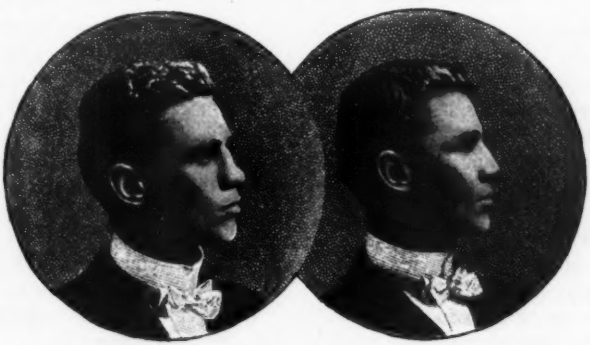
operating chair and had been put under the influence of anæsthetics, the surgeon made a vertical incision from between the eyes to the tip of the nose, and folded the flesh back on either side. A steel burr, run by a small electric motor, was then produced from a cabinet and placed against the bone. It was not long before the latter had been ground down to a straight outline. A small portion of the flesh and skin was then cut away, the edges sewn up together, and the surgeon announced that the work was completed—all but the removal of the scar by electricity a few weeks later.

REMOVING A MOLE BY ELECTRICITY.

It was upon the same principle that the ultra-prominent cheeks of the Indian lawyer had been reduced some time before.

Next I was a witness of the exact reverse nose-operation—that of building up a nose with a sunken bridge. This feat proved much more difficult and complicated. The patient was a woman. Having been placed under the influence of anæsthetics, and her nose opened in the same fashion as I had seen the surgeon treat Lindstrom's nose, instead of sawing away a good deal of bone as he did in that operation, the surgeon simply pared off the outer surface of the bone. He then placed upon the bared surface a piece of bone from the body of a rabbit especially killed for this purpose a few hours before. The patient's nose had been already carefully measured, so that when she arrived for the actual operation that afternoon the rabbit bone had been shaped to the proper size and curve.

Some substance was placed on the bones to cement them together, and then several pieces of flesh and skin were cut from the patient's body—with her previous consent, of course—and gradually grafted over the new bone. All the edges were then sewn up, and the operation pronounced completed. I have since seen a letter from the woman in which she praises the work of the surgeon in the highest terms, and begs him to accept for himself her personal check for a neat little sum.



BEFORE. AFTER.

THE EVOLUTION OF A NOSE.

The persons who patronize the beauty factories do not belong to any one

A PATIENT IN THE OPERATING CHAIR AWAITING THE BEAUTY DOCTOR.

particular class of society, although the number of evidently wealthy patients is several times larger than the number belonging to the working-classes. I learned the name —on my promise not to publish it—of more than one member of a prominent American family socially, who have had bow-legs and knock-knees made straight in order that they might look better in their golf stockings, and not a day passes by but several carriages with the crests of some members of New York's 400 on the doors stop before the entrance to the beauty factory.

I have heard people declare such operations as those carried out in the Beauty Factory sinful, just as they designate the use of cosmetics as contemptible. Sinful! contemptible! Why, the good folk are absolutely unreasonable who talk such twaddle.

Should we not always try to make the unsightly beautiful, and augment the beauty of what is beautiful already? Far from being sinful or contemptible, this should be regarded as a duty by every right-minded person.

A MOMENT AFTER.

(Suggested by a Picture in the Musée Weirtz, Brussels.)

Freed from the weary strife,
Dead to the earthly life,
Up through the ether-realm winging;
Mounting on pinions strong,
Swift through the starry throng,
Guided by angel song,
Midst the spheres ringing.

Gazing with longing eyes,
Far through the distant skies,
Swift on the wings of love soaring.
On! o'er the azure road,
On! to the blest abode,
Where, round the Throne of God,
Saints are adoring.

System on system past,
Heaven's gates in sight at last,
There, where glory is beaming.
Hark! 'tis the song of praise,
Pealing through endless days,
Yonder the glory-rays
Brightly are streaming.

Louder and louder still
Sweet seraph voices thrill,
Heaven's own harmonies blending!
"Welcome, O faithful one!
Strife is forever done,
Life, love, and bliss are won,
Glory unending!"

Levin Carnac.

POPULAR BOOKS OF THE MONTH.

A CAREFUL canvass of the leading booksellers results in the compilation of the following list of books that have proved themselves most popular during the past month, as judged by the number of copies sold:

TITLE	AUTHOR	PUBLISHER AND PUBLISHER'S PRICE
Red Pottage,	Mary Cholmondeley	(Harper & Bros., $1.50).
The Light of Scarthey,	Egerton Castle	(The Macmillan Co., $1.50).
Richard Carvel,	Winston Churchill	(The Macmillan Co., $1.50).
Young April,	Egerton Castle	(The Macmillan Co., $1.50).
Janice Meredith,	Paul Leicester Ford	(Dodd, Mead & Co., $1.50).
A Gentleman from Indiana,	Booth Tarkington	(Doubleday & McClure Co., $1.50).
David Harum,	Edward Noyes Westcott	(D. Appleton & Co., $1.50).
When Knighthood Was in Flower,	Edward Caskoden	(Bowen, Merrill & Co., $1.50).
The Market Place,	Harold Frederic	(Frederick A. Stokes Co., $1.50).
Red Rock,	Thomas Nelson Page	(Chas. Scribner's Sons, $1.50).
The Trail of the Sand Hill Stag,	E. Seton Thompson	(Chas. Scribner's Sons, $1.50).
That Fortune,	Charles Dudley Warner	(Harper & Bros., $1.50).
Concerning Isabel Carnaby,	Ellen T. Fowler	(D. Appleton & Co., $1.50).
Bob, Son of Battle,	Alfred Ollivant	(Doubleday & McClure Co., $1.25).
In Connection with the De Willoughby Claim,	Frances Hodgson Burnett	(Chas. Scribner's Sons, $1.50).
Prisoners of Hope,	Mary Johnston	(Houghton, Mifflin & Co., $1.50).
Kit Kennedy,	S. R. Crockett	(Harper & Bros., $1.50).
No. 5 John Street,	Richard Whiteing	(The Century Co., $1.50).
Mr. Dooley in the Hearts of His Countrymen,	F. P. Dunne	(Small, Maynard & Co., $1.25).
Via Crucis,	F. Marion Crawford	(The Macmillan Co., $1.50).
Santa Claus's Partner,	Thomas Nelson Page	(Chas. Scribner's Sons, $1.50).
Loyal Hearts and True,	Ruth Ogden	(Frederick A. Stokes Co., $1.50).
To Have and to Hold,	Mary Johnston	(Houghton, Mifflin & Co., $1.50).
Joan of the Sword Hand	S. R. Crockett	(Dodd, Mead & Co., $1.50).
Ben Hur	Gen'l Lew Wallace	(Harper & Bros., $1.50).
The Black Wolf's Breed,	Harris Dickson	(Bowen, Merrill & Co., $1.50).
A Man's Woman,	Frank Norris	(Doubleday & McClure Co., $1.50).
The Love of Parson Lord,	Mary E. Wilkins	(Harper & Bros., $1.25).
By the Marshes of Minas,	Charles G. D. Roberts	(Silver, Burdette & Co., $1.25).
A Manifest Destiny,	Julia Magruder	(Harper & Bros., $1.25).
The Strength of Gideon,	Paul Lawrence Dunbar	(Dodd, Mead & Co., $1.25).
Fisherman's Luck,	Henry Van Dyke	(Chas. Scribner's Sons, $2.00).
Briton and Boer,	James Bryce	(Harper & Bros., $1.25).
The Transvaal from Within,	J. P. Fitzpatrick	(Frederick A. Stokes Co., $2.50).
Letters of Robert Browning and Elizabeth Barrett		(Harper & Bros., $5.00).
Century of Science,	John Fiske	(Houghton, Mifflin & Co., $2.00).

TITLE	AUTHOR	PUBLISHER AND PUBLISHER'S PRICE
Letters of Robert Louis Stevenson (2 vols.),	Edited by Sidney Colvin	(Chas. Scribner's Sons, $5.00).
Wild Animals I Have Known,	E. Seton Thompson	(Chas. Scribner's Sons, $2.00).
The Man With the Hoe and Other Poems,	Edwin Markham	(Doubleday & McClure Co., $1.00).
Dutch and Quaker Colonies in America (2 vols.),	John Fiske	(Houghton, Mifflin & Co., $4.00).
Tramping with Tramps,	Josiah Flynt	(The Century Co., $1.50).
John Ruskin,	M. H. Spielman	(J. B. Lippincott Co., $2.00).
The Honey Makers,	Margaret Warner Morley	(A. C. McClurg & Co., $1.50).
Heroes of the Nation Series		
Bismarck,	J. W. Headlam	(G. P. Putnam's Sons, $1.50).
Alexander the Great,	Benjamin Ide Wheeler	(G. P. Putnam's Sons, $1.50).

"THE TWENTY-SEVENTH LETTER OF THE ALPHABET."

THIS was the title of a "puzzle-story" which appeared in our January number. The story lacked its final paragraph, and we offered to pay from $1 to $100 a word for that paragraph, sent in before February 20th, which should best complete the tale and solve the problem presented.

On February 20th we had received more than a thousand meritorious solutions, and unnumbered other communications which were deemed unworthy of consideration because of failure on the part of the writers to comply with the one condition of the contest, or because of the vague or frivolous character of the matter submitted.

The answer supplied us by the author of the story to the problem "What is the twenty-seventh letter of the alphabet?" was "A love-letter." This answer was submitted in various forms by sixty-five readers. But all other solutions received the same consideration, the editor having no fixed opinion as to what the solution should be. Many answers other than "A love-letter" were so remarkably ingenious that in the process of elimination they survived up to the very last. The selection of the winner was somewhat simplified by the fact that very few contestants observed the requirement plainly stated in the prize-offer, that the submitted paragraph must not only solve the problem, but *complete the story*.

The decision, after much care and comparison, was finally given to Miss Mary B. Ratcliffe, of Haden, Va., for the following paragraph, which seemed to meet best all the requirements and conditions:

* * * * * * * * * * * * *

—"A letter whose symbol was Love;—intangible, part of our mother tongue, but so often wordless! When, in her little sanctum, his queen, the little American, read that letter,—her *love letter*—her alphabet and her joy were complete, while her heart sang to an unseen Presence, 'My King! God bless him!'"

This paragraph, containing fifty-two words, received, under the terms of the offer of $1 a word for a paragraph containing from fifty to one hundred words, a payment of $52. The editor cannot refrain from expressing his regret that Miss Ratcliffe, presumably through a failure to comprehend fully the terms of the offer, allowed two words, which she could easily have eliminated, to reduce her compensation so materially. A fifty-word paragraph would have been entitled to a payment of $2 a word. But the scale of payment having been arranged with the express intention of injecting into the competition a further element of difficulty, and in justice to other competitors who had obviously pruned their matter to the utmost, the editor considered himself bound to adhere strictly to the letter of the offer.

However, as $100 had been appropriated as a prize for this contest, it was decided to award the balance, after paying the winner, to the contribution considered next in order of merit. A check for $48 has therefore been sent to Rev. H. C. Crane, East Norton, Mass., whose argument for the word "Amor" (an A more) and its application to the required sense of a love-letter was so ingenious as to be deemed entitled to second place in the competition.

Mention should be given to the contributions of the following readers, all of which, with others, were considered in the final awards:

RALPH I. LEE, St. Johnsbury, Vt.
SOPHIE C. HALL, Wilmington, Del.
HENRY H. BARROLL, Danbury, Conn.
LISBETH W. SAMMIS, Huntington, L. I.
GRACE WRIGHT, Macon, Mo.
LAURA A. PAYNE, Hutchinson, Kan.
ARTHUR HAMILTON EATON, New York City.
MARY E. DUNN, Metuchen, N. J.
MAE M. HALE, San Francisco, Cal.
MRS. R. A. ROBINSON, Onaucock, Va.
E. LEONA HAND, Philadelphia, Pa.